Note remarks

: MB 6,0 D 12 Test sheet

Edition : 08.06.90

Replaces

Test oil : ISO-4113

: 0 403 446 246A Combination no.

Injection pump

Pump designation: PES6MW100/720RS1144

EP type number : 0 413 406 138

Governor

Governor design. : RQV300...1300MW50-6

: 0 420 083 209 Governer no.

Customer-spec. information : MB-NFZ Customer

Engine : 0M366A

1st version kW : 125.0 Rated speed : 2600

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

pressure, bar : 172...175

Test lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00X1.50X609 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 30...32

: 3.70...3.80 Prestroke mm

: (3.65...3.85)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

BASIC SETTING

1st speed rpm : 1300

Rack travel in mm : 11.00...11.10

Del.quantity cm3/: 7.7...7.9

100 s: (7.5...8.1)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.0 2nd speed Rack travel in mm : 8.0...8.2

Del.quantity cm3/: 0.9...1.3 100 s: (0.6...1.5)

cm3 : 0.3 Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed

rpm : 1430 : 9.30...9.70 travel mm

: 1340 2nd speed rom travel mm

: 8.50...8.70 3rd speed : 500 rpm

: 2.70...3.30 travel mm

4th speed rpm 1.20...1.60 travel mm

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

rpm : 1300

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1300 Speed Aneroid pressure h: 800

Del.quantity 1000

: 77.0...79.0 : (75.0...81.0)

: 3.50 cm3 Spread 1000 : (6.00)

RATED SPEED

A01

1st version Control lever Speed position degrees: 108...116 Testing: 1st rack travel in: 10.00 rpm : 1340...1350 Speed 2nd rack travel in: 4.00 Speed rpm : 1425...1455 4th rack travel in: 1550 rpm : 0.00...1.00 Speed LOW IDLE 1 Control lever position degrees: 78...86 Setting point w/out bumper spring Speed rpm : 300 BREAKAWAY Rack travel in mm: 8.1 1st version Testina: : 100 Speed rom Minimum rack trave: 9.20 rpm : 300 Speed Rack travel in mm : 8.00...8.20 TORQUE CONTROL Dimension a mm : 1.20 Torque control curve - 1st version Speed 1st speed rpm : 1300 Rack travel in m: 10.90...11.00 2nd speed rpm : 800 Rack travel in m: 11.80...12.00 d speed rpm : 585 Rack travel in m: 12.00...12.20 LOW IDLE 3rd speed Speed rpm : 1100 4th speed Rack travel in m: 11.10...11.30 Aneroid/Altitude Spread Compensator Test Remarks: 1st version Pressure hPa : -Rack travel mm : 8.50...8.60 1st pressure hPa : 180 Rack travel in m: 9.00...9.10 2nd pressure hPa : 450 Rack travel in m: 11.10...11.40 3rd pressure hPa : 800 Rack travel in m: 12.00...12.20 START CUT-CUT 1/min: 230 (250) Speed FUEL DELIVERY CHARACTERISTICS 1st version

Aneroid pressure h: 800 rpm : 800 Del.quantity cm3/: 76.0...78.0 1000 s: (74.0...80.0) Spread cm3 : 5.00 1000 s: (7.0) Aneroid pressure h: 800 Speed rpm : 585 Del.quantity cm3/ : 68.5...71.5 1000 s: (66.0...74.0) Aneroid pressure h: -Speed rpm : 500 Del.quantity cm3/: 20.0...22.0 1000 s: (18.0...24.0) 1mm rack travel less than full load rack tr: 10.00 rpm : 1340...1350 STARTING FUEL DELIVERY

rpm : 100 Del.quantity cm3/: 78.0...88.0 1000 s: (75.0...91.0)

rpm : 300 Rack travel in mm : 8.00...8.20 Del.quantity cm3/: 9.0...13.0 1000 s: (6.5...15.5) cm3 : 3.50 1000 s: (5.50)

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A02

Note remarks

Test sheet Edition

: IHC 8,8 T 2 : 06.07.90

Replaces

: ISO-4113 Test oil

Combination no.

: 0 403 446 253

Injection pump

Pump designation : PES6MW100/320RS1176

EP type number : 0 413 406 158

Governor

Governor design.

: RQV275...1250MW80-6

: 0 420 083 215 Governer no.

Customer-spec. information

Customer

: RVI

Engine

: MIDR 060226H

1st version kW

: 143.0

Rated speed

: 2500

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C

: 38...42

Overflow valve

: 2 417 413 033

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

pressure, bar : 172...175

Test lines

: 1 680 750 008

Outside diameter

x Wall thickness

x Length mm

: 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 30...32

Prestroke mm

: 3.50...3.60

: (3.45...3.65)

Rack travel in mm : 9.00...12.00

Phasina

Firing order

: 0-60-120-180-240-300

: 1-5-3-6-2-4

Tolerance + - °

: 0.50 (0.75)

BASIC SETTING

1st speed

rpm: 1250

Rack travel in mm : 11.40...11.50

Del.quantity cm3/: 9.9...10.1

100 s: (9.7...10.3)

Spread

cm3 : 0.3

100 s: (0.6)

rpm : 275.0 2nd speed

Rack travel in mm : 6.60...6.80

Del.quantity cm3/: 2.0...2.4

100 s: (1.7...2.6) cm3 : 0.3 Spread

100 s: (0.5)

(B) Setting of injection pump

with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 1450

: 8.90...9.30 travel mm

: 1325 2nd speed man

travel mm : 8.00...8.20

3rd speed 500 rpm

: 3.00...3.60 : 275 travel mm

4th speed rpm

: 1.00...1.40 travel mm

GUIDE SLEEVE POSITION

Control-lever position

Degree: -1

rpm : 1320

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1250 Aneroid pressure h: 750 Del.quantity 1000

: 99.0...101.0

: (97.0...103.0)

: 3.50 cm3Spread

1000 : (6.00)

RATED SPEED

1st version Control lever position degrees: 50...58 Testing: 1st rack travel in: 10.40 rpm : 1335...1345 Speed 2nd rack travel in: 4.00 Speed rpm : 1450...1480 4th rack travel in: 1550 rpm : 0.00...1.00Speed LOW IDLE 1 Control lever position degrees: 15...23 Setting point w/out bumper spring rpm : 275 Speed Rack travel in mm: 6.7 Testing: : 200 Speed rpm Minimum rack trave: 7.00 : 275 rom Rack travel in mm : 6.60...6.80 Aneroid/Altitude Compensator Test 1st version Setting Speed : 500 man hPa : 750 Pressure Rack travel mm : 11.40...11.50 Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 9.60...9.70 2nd pressure hPa : 150 Rack travel in m: 9.90...10.00 3rd pressure hPa : 300 Rack travel in m: 10.90...11.20 START CUT-OUT 1/min: 200 (220) Speed FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 750 : 750 Speed rpm Del.quantity cm3/: 94.5...97.5 1000 s: (92.0...100.0) Spread cm3 : 5.00 1000 s: (7.0) Aneroid pressure h: -

Speed rpm : 500
Del.quantity cm3/ : 51.0...53.0
 1000 s: (49.0...55.0)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 10.40 Speed rpm : 1335...1345

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/: 88.0...102.0 1000 s: (85.0...105.0) Rack travel in mm : 19.50...21.00

LOW IDLE

Speed rpm : 275
Rack travel in mm : 6.60...6.80
Del.quantity cm3/ : 20.0...24.0
1000 s: (17.5...26.5)
Spread cm3 : 3.50

1000 s: (5.50)

:

Remarks:

Set start-of-delivery sensor at prestroke to 3.50...3.60 mm for cylinder 1.

A04

Note remarks

: MB 6,0 D 89 : 01.06.90 Test sheet

Edition

Replaces

Test oil : ISO-4113

Combination no. : 0 403 446 257

Injection pump

Pump designation : PES6MW100/720RS1144

: 0 413 406 138 EP type number

Governor

Governor design. : RQV300...1300MW50-7

: 0 420 083 221 Governer no.

Customer-spec. information : MB-NFZ Customer

: 0M366A Engine

: 125.0 1st version kW Rated speed : 2600

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

**Opening** 

pressure, bar : 172...175

Test lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 30...32

: 3.70...3.80 Prestroke mm

: (3.65...3.85)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

rpm : 13001st speed

Rack travel in mm : 10.90...11.00

Del.quantity cm3/: 7.2...7.4

100 s: (7.0...7.6)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.02nd speed Rack travel in mm: 7.8...7.9 Del.guantity cm3/: 0.9...1.3

100 s: (0.6...1.5)

cm3 : 0.3Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 1350 1st speed

: 8.50...8.70 travel mm : 1450

2nd speed rpm

travel mm : 9.50...9.90

500 3rd speed rpm

: 2.70...3.30 travel mm

: 300 4th speed rpm

: 1.20...1.70 travel mm

GUIDE SLEEVE POSITION

Control-lever position

Degree: -1 rpm : 1350

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1300 Speed

Aneroid pressure h: 900

: 72.0...74.0 Del.quantity 1000 : (70.0...76.0)

: 3.50 Spread cm3

1000 : (6.00)

RATED SPEED

1/min : 230 (250) 1st version Speed Control lever FUEL DELIVERY CHARACTERISTICS position degrees: 108...116 Testina: 1st version 1st rack travel in: 9.90 rpm : 1340...1350 Aneroid pressure h: 900 Speed 2nd rack travel in: 4.00 : 800 Speed rpm Del.quantity cm3/: 71.0...73.0 1000 s: (69.0...75.0) rpm : 1425...1455 Speed 4th rack travel in: 1550 cm3 : 5.00rpm : 0.00...1.00Spread Speed 1000 s: (7.0) Aneroid pressure h: 900 LOW IDLE 1 rpm : 585 Control Lever Speed Del.quantity cm3/: 65.0...68.0 1000 s: (62.5...70.5) position degrees: 77...85 Setting point w/out bumper spring Aneroid pressure h: rpm : 300 Speed rpm : 500 Del.quantity cm3/ : 20.0...22.0 Rack travel in mm: 7.8 1000 s: (18.0...24.0) Testing: Speed rpm : 100 Minimum rack trave: 9.30 : 300 BREAKAWAY rpm Rack travel in mm : 7.80...7.90 1st version 1mm rack travel less than CONSTANT REGULATION rpm : 330...500 Speed full load rack tr: 9.90 rpm : 1340...1350 TORQUE CONTROL Speed Dimension a mm : 1.00 STARTING FUEL DELIVERY Torque control curve - 1st version rpm : 1300 1st speed Rack travel in m: 10.90...11.00 : 100 rpm : 800 Speed 2nd speed rpm Rack travel in m: 11.60...11.80 3rd speed rpm : 585 Rack travel in m: 11.80...12.00 Del.quantity cm3/: 78.0...88.0 1000 s: (75.0...91.0) Rack travel in mm : 19.00...21.00 Aneroid/Altitude LOW IDLE Compensator Test : 300 Speed rpm Rack travel in mm : 7.80...7.90 Del.quantity cm3/: 9.0...13.0 1000 s: (6.5...15.5) Spread cm3 : 3.50 1000 s: (5.50) 1st version Setting : 500 Speed rpm Pressure hPa : -: 8.50...8.60 Rack travel mm Remarks: Measurement 1/min: 500 Speed 1st pressure hPa : 300 Rack travel in m: 10.00...10.10 2nd pressure hPa : 500 Rack travel in m: 11.20...11.50 3rd pressure hPa : 900 Rack travel in m: 11.80...12.00 START CUT-OUT

Note remarks

Test sheet : MB 6,0 0 58 Edition : 29.06.90

Replaces

Test oil : ISO-4113

: 0 403 446 258 Combination no.

Injection pump

Pump designation : PES6MW100/720RS1129

EP type number : 0 413 406 121

Governor

Governor design. : RQV300...1300MW50-8

: 0 420 083 222 Governer no.

Customer-spec. information : MO-NFZ Customer

: OM 366 LA Engine

1st version kW : 149.0 Rated speed : 2600

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

**Opening** 

pressure, bar : 172...175

Test Lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00X1.50X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 30...32

: 3.70...3.80 Prestroke mm (3.65...3.85)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

1st speed rpm: 1300

Rack travel in mm : 11.40...11.50

Del.quantity cm3/: 10.1...10.3

100 s: (9.9...10.5)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.02nd speed Rack travel in mm: 5.5...5.6

Del.quantity cm3/: 0.9...1.1 100 s: (0.6...1.4)

cm3 : 0.3 Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL 1st speed

rpm : 1340 : 8.60...8.80 travel mm

: 1430 2nd speed rom travel mm

: 9.30...9.70

: 300 3rd speed rpm

: 1.20...1.60 travel mm 4th speed : 700 rpm

travel mm : 3.80...4.40

GUIDE SLEEVE POSITION

Control-lever position

Degree: -1

rpm : 1340 Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1300 Speed Aneroid pressure h: 700

Aneroiu p. Del.quantity 1000

: 101.0...103.0 : (99.0...105.0)

: 3.50 cm3 Spread

1000 : (6.00)

RATED SPEED

A07

1st version Control lever position degrees: 116...124 Testing: 1st rack travel in: 10.40 rpm : 1340...1350 Speed 2nd rack travel in: 4.00 rpm : 1440...1470 Speed 4th rack travel in: 1550 rpm : 0.00...1.00 Speed LOW IDLE 1 Control lever position degrees: 82...90 Setting point w/out bumper spring Speed rpm: 300 Rack travel in mm: 5.5 Testing: Speed rpm : 100 Minimum rack trave: 7.50 Speed rpm : 300 Rack travel in mm : 5.50...5.60 SET IDLE AUXILIARY SPRING Rack travel in mm: 2.00 CONSTANT REGULATION rpm : 320...530 Speed Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm hPa : 300 Pressure Rack travel mm : 8.30...8.50 Measurement Speed  $1/\min : 500$ 1st pressure hPa : -Rack travel in m: 7.40...7.50 2nd pressure hPa : 450 Rack travel in m: 10.10...10.30 3rd pressure hPa : 700 Rack travel in m: 11.40...11.50 START CUT-OUT 1/min: 220 (230) Speed FUEL DELIVERY CHARACTERISTICS

Speed rpm : 600 Del.quantity cm3/: 85.5...88.5 1000 s: (83.0...91.0) cm3 : 5.00Spread 1000 s: (7.0) Aneroid pressure h: -Speed rpm : 500 Del.quantity cm3/ : 27.0...29.0 1000 s: (25.0...31.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 10.40 rpm : 1340...1350 Speed STARTING FUEL DELIVERY Speed rpm : 100 Del.quantity cm3/: 88.0...98.0 1000 s: (85.0...101.0) LOW IDLE Speed rpm : 300

Rack travel in mm : 5.50...5.60 Del.quantity cm3/: 9.0...11.0 1000 s: (6.0...14.0)

1000 s: (6.0...14 cm3 : 3.50

Spread cm3 : 3.50 1000 s: (5.00)

Remarks:

80A

1st version

Aneroid pressure h: 700

Note remarks

: MB 6,0 D 65 Test sheet : 29.06.90 Edition

Replaces

: ISO-4113 Test oil

: 0 403 446 259 Combination no.

Injection pump

Pump designation : PES6MW100/720RS1131-

: 0 413 406 165 EP type number

Governor

Governor design.: RQV300...1300MW68-2

: 0 420 083 224 Governer no.

Customer-spec. information Customer : MB-NFZ

: 0M366LA Engine

1st version kW : 177.0 Rated speed : 2600

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening 1

: 172...175 pressure, bar

: 1 680 750 015 Test lines

Outside diameter

x Wall thickness

x Length mm : 6.00X1.50X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 30...32

: 3.50...3.60 Prestroke mm

: (3.45...3.65)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

1st speed rpm: 1300

Rack travel in mm : 14.40...14.50

Del.quantity cm3/: 11.4...11.6

100 s: (11.2...11.8)

cm3 : 0.3Spread

100 s: (0.6)

2nd speed rpm : 300.0Rack travel in mm: 6.3...6.5 Del.guantity cm3/: 1.0...1.4

100 s: (0.7...1.6)

cm3 : 0.3Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 1450 1st speed : 9.30...9.70 travel mm

: 1350

2nd speed rpm

travel mm : 8.40...8.60 : 600

3rd speed rpm

: 3.90...4.50 : 300 travel mm

4th speed rpm

: 0.80...1.20 travel mm

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

rpm : 1350 Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1300 Speed Aneroid pressure h: 1000

Del.quantity : 114.0...116.0 1000 : (112.0...118.0)

: 3.50 cm3 Spread

1000 : (6.00)

RATED SPEED

1st version Control lever position degrees: 116...124 Testing: 1st rack travel in: 13.40 rpm : 1340...1350 Speed 2nd rack travel in: 4.00 rpm : 1480...1510 Speed 4th rack travel in: 1600 rpm : 0.00...1.00 Speed LOW IDLE 1 Control lever position degrees: 78...86 Setting point w/out bumper spring : 300 Speed rpm Rack travel in mm: 6.4 Testing: : 100 Speed rpm Minimum rack trave: 9.00 : 300 rpm Rack travel in mm : 6.30...6.50 Aneroid/Altitude Compensator Test 1st version Settina : 500 Speed rpm Pressure hPa : -Rack travel mm : 10.20...10.30 Measurement  $1/\min: 500$ Speed 1st pressure hPa : 200 Rack travel in m: 11.50...11.70 2nd pressure hPa : 400 Rack travel in m: 13.00...13.20 3rd pressure hPa : 1000 Rack travel in m: 14.40...14.50 START CUT-OUT 1/min: 180 (200) Speed FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 1000 . 750 Speed rpm Del.quantity cm3/: 106.5...109.5 1000 s: (104.0...112.0) cm3 : 5.00Spread

1000 s: (7.0)

Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 35.0...37.0 1000 s: (33.0...39.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 13.40 rpm : 1340...1350 Speed STARTING FUEL DELIVERY Speed : 100 rpm Del.quantity cm3/: 100.0...110.0 1000 s: (97.0...113.0) LOW IDLE Speed : 300 rpm Rack travel in mm : 6.30...6.50 Del.quantity cm3/: 10.0...14.0 1000 s: (7.5...16.5) Spread cm3: 3.50 1000 s: (5.50)

Note remarks

Test sheet : MB 6,0 D 35 Edition : 06.07.90

Replaces

: TSO-4113 Test oil

: 0 403 446 260 Combination no.

Injection pump

Pump designation : PES6MW100/720RS1120

EP type number : 0 413 406 112

Governor

: RQV300...1300MW50-9 Governor design.

: 0 420 083 223 Governer no.

Customer-spec. information Customer : MB-NFZ

Engine : 0M366LA

1st version kW : 149.0 Rated speed : 2600

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening |

: 172...175 pressure, bar

: 1 680 750 015 Test lines

Outside diameter

x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF BELIVERY

Test pressure, bar: 30...32

: 3.50...3.60 Prestroke mm : (3.45...3.65)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

BASIC SETTING

1st speed rpm : 1300

Rack travel in mm : 13.90...14.00

Del.quantity cm3/: 10.8...11.0

100 s: (10.6...11.2)

Spread cm3 : 0.3

100 s: (0.6)

rpm : 300.02nd speed Rack travel in mm: 6.4...6.6 Del.quantity cm3/: 0.9...1.3 100 s: (0.7...1.5)

Spread cm3 : 0.3100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 1450 1st speed : 9.40...10.00 travel mm

: 1350

2nd speed rpm

travel mm : 8.50...8.70

3rd speed : 450 rpm

: 2.40...3.00 : 300 travel mm

4th speed rpm

travel mm : 1.20...1.60

GUIDE SLEEVE POSITION

Control-lever position Degree: -1

rpm : 1340

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1300

Aneroid pressure h: 1000

Del.quantity 1000 : 108.0...110.0 : (106.0...112.0)

: 3.50 cm3 Spread

1000 : (6.00)

RATED SPEED

cm3 : 3.501st version Spread Control lever 1000 s: (6.0) position degrees: 111...119 Aneroid pressure h: -Speed rpm : 500 Del.quantity cm3/ : 21.0...23.0 1000 s: (19.0...25.0) Testing: 1st rack travel in: 12.90 rpm : 1340...1350 Speed 2nd rack travel in: 4.00 Speed rpm : 1460...1490 4th rack travel in: 1530 **BREAKAWAY** rom : 0.00...1.00 1st version Speed 1mm rack travel less than LOW IDLE 1 full load rack tr: 12.90 Control Lever rpm : 1340...1350 position degrees: 76...84 Speed Setting point w/out bumper spring Speed rpm: 300 STARTING FUEL DELIVERY Rack travel in mm: 6.5 rpm : 100 Testing: Speed Del.guantity cm3/: 90.0...100.0 Speed rpm : 100 1000 s: (87.0...103.0) Minimum rack trave: 8.00 Speed rpm : 300 Rack travel in mm : 6.40...6.60 LOW IDLE rpm : 300 CONSTANT REGULATION Speed rpm : 320...550 Rack travel in mm : 6.40...6.60 Speed Del.quantity cm3/: 9.0...13.0 1000 s: (7.0...15.0) Aneroid/Altitude cm3 : 3.50 1000 s: (5.50) Compensator Test Spread Remarks: 1st version Settina : 500 Speed rpm Pressure hPa : -Rack travel mm : 8.10...8.10 Measurement 1/min: 500 Speed 1st pressure hPa : 280 Rack travel in m: 9.40...9.60 2nd pressure hPa : 600 Rack travel in m: 12.50...12.70 3rd pressure hPa : 1000 Rack travel in m: 13.90...14.00 START CUT-OUT 1/min: 230 (250) Speed FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 1000 rpm : 750 Speed Del.quantity cm3/: 98.0...102.0 1000 s: (96.0...104.0)

Note remarks

: MAN 7,2 W : 06.07.90 Test sheet Edition : 02.05.90 Replaces Test oil : ISO-4113

Combination no. : 0 403 456 109

Injection pump

Pump designation : PES6MW100/321RS1200 : 0 413 406 189 EP type number

Governor

Governor design. : RQV250...1200MW83-2

: 0 420 083 216 Governer no.

Cust. part no. : 3-7036

Customer-spec. information Customer : MAN

: D 0826 LF02 Engine

: 169.0 1st version kW : 2400 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina

: 172...175 pressure, bar

Test lines : 1 680 750 008

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values \_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 30...32

: 3.50...3.60 Prestroke mm

: (3.45...3.65)

Rack travel in mm : 9.00...12.00 Firing order : 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 10001st speed

Rack travel in mm : 12.50...12.60

Del.quantity cm3/: 13.7...13.9

100 s: (13.5...14.1)

cm3 : 0.3Spread

100 s: (0.6)

2nd speed rpm : 250.0 Rack travel in mm: 4.9...5.1 Del.quantity cm3/: 1.6...2.0

100 s: (1.3...2.2) cm3 : 0.3

Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 1250 1st speed

: 10.50...10.60 travel mm

rpm : 810 2nd speed

: 5.90...6.10 travel mm

rpm : 500 3rd speed

3.70...4.30 250 1.20...1.60 travel mm

4th speed DOM

travel mm

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1000 Speed

Aneroid pressure h: 1000 Del.quantity : 137.0...139.0

1000 : (135.0...141.0)

Spread cm3 : 3.50 1000 : (6.00)RATED SPEED 1st version Control lever position degrees: 120...128 Testina: 1st rack travel in: 11.50 Speed rpm : 1245...1260 2nd rack travel in: 4.00 rpm : 1300...1330 Speed 4th rack travel in: 1400 rpm : 0.00...1.00Speed LOW IDLE 1 Control lever position degrees: 77...85 Setting point w/out bumper spring : 250 rom Rack travel in mm: 5.0 Testina: : 100 Speed rpm Minimum rack trave: 6.50 rpm : 250 Rack travel in mm : 4.90...5.10 CONSTANT REGULATION Speed : 330...420 rom Aneroid/Altitude Compensator Test 1st version Settina : 500 Speed man hPa : 170 Pressure Rack travel mm : 10.00...10.10 Measurement  $1/\min : 500$ Speed 1st pressure hPa : -Rack travel in m: 9.70...9.80 2nd pressure hPa : 550 Rack travel in m: 11.90...12.20 3rd pressure hPa : 1000 Rack travel in m: 12.50...12.60 START CUT-OUT

1/min: 170 (200)

FUEL DELIVERY CHARACTERISTICS

1st version Aneroid pressure h: 1000 : 600 rpm Del.quantity cm3/: 135.0...138.0 1000 s: (132.5...140.5) cm3 : 5.00 Spread 1000 s: (7.0) Aneroid pressure h: 1000 Speed rpm : 800 Del.quantity cm3/: 138.0...141.0 1000 s: (135.5...143.5) : 1200 Speed rpm Del.quantity cm3/: 136.0...139.0 1000 s: (133.5...141.5) Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 74.0...76.0 1000 s: (?2.0...78.0) BREAKAWAY 1st version 1mm rack travel less than

STARTING FUEL DELIVERY

full load rack tr: 11.50

Speed rpm : 100 Del.quantity cm3/ : 130.0...140.0 1000 s: (127.0...143.0)

rpm : 1245...1260

LOW IDLE

Speed

Remarks:

: MAN # 3-7036 Start-of-delivery mark at 14° angular displacement of the cam after start of delivery of cylinder 1

Speed

Note remarks

: MAN 7,2 V Test sheet Edition : 06.07.90 Replaces : 02.05.90 Test oil : ISO-4113

Combination no. : 0 403 456 110

Injection pump

Pump designation : PES6MW100/321RS1201

: 0 413 406 190 EP type number

Governor

Governor design. : RQ250/1200MW84-3 : 0 420 082 043 Governer no.

: 3-7047 Cust. part no.

Customer-spec. information : MAN Customer

: D 0826 LF02 Engine

: 165.0 1st version kW : 2400 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Openina

pressure, bar : 172...175

Test Lines : 1 680 750 008

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 30...32

: 3.50...3.60 Prestroke mm

: (3.45...3.65)

Rack travel in mm : 15.00...0.00

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 1000 1st speed

Rack travel in mm : 12.50...12.60

Del.quantity cm3/: 13.7...13.9

100 s: (13.5...14.1)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 250.0 2nd speed Rack travel in mm: 5.4...5.6 Del.quantity cm3/ : 1.6...2.0

100 s: (1.3...2.2)

cm3 : 0.5 Spread 100 s: (0.7)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 13001st speed

: 8.40...8.80 travel mm 2nd speed rpm : 1260

travel mm : 6.60...6.80 3rd speed rpm : 345

: 4.00...4.60 travel mm

: 250 : 1.80...2.20 4th speed rpm

travel mm

GUIDE SLEEVE POSITION Control-Lever position

Degree: -2 rpm : 1000

Rack travel in mm : 18.20...19.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1000

Aneroid pressure h: 1000

Del.quantity : 137.0...139.0 1000 : (135.0...141.0)

2nd pressure hPa : 550 Rack travel in m: 11.90...12.20 3rd pressure hPa : 1000 cm3 : 3.50Spread 1000 : (6.00) RATED SPEED Rack travel in m: 12.60...12.80 1st version START CUT-OUT Control lever position degrees: 92...100 Speed 1/min: 180 (200) Setting point: FUEL DELIVERY CHARACTERISTICS Speed : 1000 rom Rack travel in mm: 19.0 1st version Aneroid pressure h: 1000 Testing: 1st rack travel in: 11.50 Speed : 600 rpm Del.quantity cm3/: 135.0...138.0 1000 s: (132.5...140.5) Speed rpm : 1245...1260 2nd rack travel in: 4.00 rpm : 1300...1330 cm3 : 5.00Speed Spread 1000 s: (7.0) Aneroid pressure h: 1000 4th rack travel in: 1400 rpm : 0.00...1.00Speed Speed rpm : 800 Del.quantity cm3/: 138.0...141.0 LOW IDLE 1 Control lever 1000 s: (135.5...143.5) rpm : 1200 position degrees: 69...77 Speed Del.quantity cm3/: 134.5...137.5 1000 s: (132.0...140.0) Setting point w/out bumper spring rpm : 250 Speed Rack travel in mm: 5.5 Aneroid pressure h: -Speed rpm : 500 Del.quantity cm3/: 74.0...76.0 Testing: 1000 s: (72.0...78.0) Speed rom : 100 Minimum rack trave: 7.00 Speed : 250 Rack travel in mm : 5.40...5.60 BREAKAWAY TORQUE CONTROL 1st version Torque control curve - 1st version 1mm rack travel less than rpm : 1000 1st speed Rack travel in m: 12.50...12.60 full load rack tr: 11.50 rpm : 1245...1260 : 600 2nd speed rpm Speed Rack travel in m; 12.60...12.80 : 800 3rd speed STARTING FUEL DELIVERY rpm Rack travel in m: 12.50...12.80 : 1200 4th speed rom Speed rpm : 100 Del.quantity cm3/ : 130.0...140.0 1000 s: (127.0...143.0) Rack travel in m: 12.20...12.40 Aneroid/Altitude Compensator Test LOW IDLE Speed rpm: 250
Rack travel in mm: 5.40...5.60
Del.quantity cm3/: 16.0...20.0 1st version Setting : 500 Speed rom hPa : 170 1000 s: (13.5...22.5) Pressure : 10.20...10.30 cm3 : 5.00 Rack travel mm Spread 1000 s: (7.00) Measurement Speed 1/min: 500 Remarks: : MAN # 3-7047 Start-of-delivery mark = 13,5° after 1st pressure hPa : -

start of delivery cyl. 1.

Rack travel in m: 10.00...10.10

Note remarks

: CUM 8,3 a : 03.07.90 Test sheet Edition : 10.86 Replaces Test oil : ISO-4113

Combination no. : 9 400 083 449

Injection pump

Pump designation : PES6A100D320/3RS2691

: 9 410 230 025 EP type number

Governor

: RSV400...1100A2C2209 Governor design.

: 9 420 083 201 Governer no.

Customer-spec. information Customer : CUMMINS

Engine : 6 CT 8.3 L

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm

: 2.80...2.90 : (2.75...7.95)

Rack travel in mm : 9.00...12.00 Firing order : 1-5- 3- 6-

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 9.00...12.00

& maximum rack tra: 21.00 Difference ° CS : 3.00...4.00

BASIC SETTING

rpm: 1100 1st speed

Rack travel in mm : 10.30...10.40

Del.guantity cm3/: 9.0...9.2

100 s: (8.8...9.4)

Spread cm3 : 0.3

100 s: (0.6)

rpm : 400.0 2nd speed Rack travel in mm : 5.7...5.9 Del.quantity cm3/ : 1.6...2.0

100 s: (1.4...2.3)

cm3 : 0.3Spread

100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 2.50

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed : 1100 rpm

Del.quantity 90.0...92.0 : (88.0...94.0) 1000

: 3.50 Spread cm3 1000 : (6.00)

RATED SPEED

1st version

Control lever

position degrees: 85...93

Testing:

1st rack travel in: 9.30 rpm : 1140...1150 Speed 2nd rack travel in: 4.00 rpm : 1170...1200 Speed 4th rack travel in: 1300 rpm : 0.30...1.70Speed LOW IDLE 1 Control Lever position degrees: 62...70 Setting point w/out bumper spring rpm : 400 Rack travel in mm: 5.3 Testing: : 100 Speed rpm Minimum rack trave: 19.00 : 400 rpm Rack travel in mm : 5.70...5.90 Rack travel in mm : 2.00 rpm : 495...555 Speed TORQUE CONTROL Torque control curve - 1st version rpm : 1100 1st speed Rack travel in m: 10.30...10.40 od speed rpm : 500 Rack travel in m: 10.30...10.50 2nd speed 5th speed rpm : 400 Rack travel in m: 10.70...11.20 FUEL DELIVERY CHARACTERISTICS 1st version Speed rpm : 500 Del.quantity cm3/ : 74.0...77.0 1000 s: (71.5...79.5) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 9.30 rpm : 1140...1150 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 135.0...149.0 1000 s: (132.0...152.0) Rack travel in mm : 19.00...21.00

: 400

rpm Rack travel in mm : 5.70...5.90

Del.quantity cm3/: 16.5...20.5 1000 s: (14.0...23.0) cm3 : 3.50Spread 1000 s: (5.50) Remarks: Start of delivery - engine 11° before

LOW TDLE

Speed

Note remarks

: MB 5,7 o 4 Test sheet Edition : 03.07.90 Replaces : 1.86 Test oil : ISO-4113

Combination no. : 9 400 085 254

Injection pump

Pump designation : PES6A90D410RS2293 : 0 410 896 031 EP type number

Governor

Governor design. : RSV500...900A0B2211-

1L

: 9 420 083 204 Governer no.

Customer-spec. information

Customer : MERCEDES-BENZ

Engine : OM 352 (A)

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.15...2.25 : (2.10...2.30) Prestroke mm

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

rpm: 880 1st speed

Rack travel in mm : 10.00...10.10

Del.quantity cm3/: 5.7...5.8

100 s: (5.5...6.0)

Spread cm3 : 0.3

100 s: (0.5)

rpm : 500.02nd speed Rack travel in mm: 6.4...6.6

Del.quantity cm3/: 1.0...1.4 100 s: (0.8...1.6)

cm3 : 0.2Spread 100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 rpm : 800

Rack travel in mm : 0.30...1.00

Governor spring pre-tension Click setting x : 4.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 880 Speed

: 57.0...58.0 Del.quantity 1000 : (55.0...60.0)

: 3.00 Spread cm3 : (5.00) 1000

RATED SPEED

1st version

Control lever

position degrees: 83...91

Testing:

1st rack travel in: 9.00 rpm : 905...910 Speed 2nd rack travel in: 4.00 rpm : 950...955 Speed

4th rack travel in: 1100 rpm : 0.30...1.70Speed

LOW IDLE 1

Control lever position degrees: 71...79 Setting point w/out bumper spring Speed rpm : 500 Rack travel in mm: 6.00 Testing: Speed : 100 rpm Minimum rack trave: 19.60 : 500 Speed rpm Rack travel in mm : 6.40...6.60 Rack travel in mm : 2.00 : 535...595 Speed rom TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 880 Rack travel in m: 10.00...10.10 nd speed rpm : 500 Rack travel in m: 10.00...10.20 2nd speed rpm : 400 4th speed Rack travel in m: 11.40...11.60 BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 9.00 : 905...910 Speed rpm STARTING FUEL DELIVERY Speed : 100 rpm Rack travel in mm : 14.20...14.80 LOW IDLE : 500 Speed rpm Rack travel in mm : 6.40...6.60 Del.quantity cm3/: 10.0...14.0 1000 s: (8.0...16.0) cm3 : 2.50 Spread 1000 s: (4.50) Remarks: APPLICATION

ζ.

Generator

Note remarks

Test sheet

: MWM 3,9 d 1 : 03.07.90 Edition

Replaces Test oil

: ISO-4113

Combination no.

: 9 400 085 313

Injection pump

Pump designation : PES4A90D320RS2744 EP type number : 9 400 084 012

Governor

: RSV350...1150A2B2129 Governor design.

-8R

Governer no.

: 9 420 083 241

Customer-spec. information Customer : MWM

Engine

: TD 229 EC-4

: 73.6 1st version kW : 2300 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 046

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina .

pressure, bar : 172...175

Test lines : 1 680 750 014

Outside diameter

x Wall thickness

x Lenath mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.70...2.80 Prestroke mm

: (2.65...2.85)

Rack travel in mm : 9.00...12.00

: 1-3-4-2 Firina order

: 0-90-180-270 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 9.00...12.00 & maximum rack tra: 21.00 Difference ° CS : 3.00...4.00

BASIC SETTING

rpm: 1150 1st speed

Rack travel in mm : 10.50...10.60

Del.quantity cm3/: 8.6...8.7

100 s: (8.4...8.9)

cm3 : 0.3Spread

100 s: (0.5)

rpm : 350.02nd speed Rack travel in mm: 5.3...5.5

Del.quantity cm3/: 1.1...1.5 100 s: (0.9...1.7)

cm3 : 0.2 Spread

100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

rpm : 800 Speed

Rack travel in mm : 0.30...1.00

Governor spring pre-tension Click setting x : 5.50

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed : 1150 rpm

: 86.5...87.5 Del.quantity

1000 : (84.5...89.5) : 3.00 cm3

Spread 1000 : (5.00)

RATED SPEED

1st version

Control lever position degrees: 99...107 Testina: 1st rack travel in: 9.50 rpm : 1190...1200 Speed 2nd rack travel in: 4.00 rpm : 1260...1290 Speed 4th rack travel in: 1450 Speed rpm : 0.30...1.70 LOW IDLE 1 Control Lever position degrees: 74...82 Setting point w/out bumper spring rpm : 350 Rack travel in mm: 4.9 Testing: : 100 Speed rpm Minimum rack trave: 19.00 rpm : 350 Rack travel in mm : 5.30...5.50 Rack travel in mm : 2.00 rpm : 555...615 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1150 Rack travel in m: 10.50...10.60 2nd speed rpm : 500 Rack travel in m: 10.80...10.90 3rd speed rpm : 800 Rack travel in m: 10.80...10.90 4th speed rpm : 960 Rack travel in m: 10.60...10.80 FUEL DELIVERY CHARACTERISTICS 1st version Speed rpm : 500 Del.quantity cm3/: 80.5...82.5 1000 s: (78.0...85.0) Speed rpm : 800 Del.quantity cm3/: 85.0...87.0 1000 s: (82.5...89.5) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 9.50 rpm : 1190...1200 Speed

Speed rpm : 100
Rack travel in mm : 19.00...21.00
LOW IDLE
Speed rpm : 350
Pack travel in mm : 5.30 5.50

Remarks:

: VALMET

STARTING FUEL DELIVERY

Note remarks

: MWM 5,9 L Test sheet : 03.07.90 Edition

Replaces

: ISO-4113 Test oil

Combination no. : 9 400 085 314

Injection pump

Pump designation : PES6A90D320RS2718 EP type number : 9 400 084 003

Governor

: RSV350...1150A2B2097 Governor design.

-2R

: 9 420 083 224 Governer no.

Customer—spec. information Customer : MWM

: TD 229 EC-06 Engine

: 117.8 1st version kW : 2300 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 046

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.70...2.80 Prestroke mm

: (2.65...2.85)

Rack travel in mm : 9.00...12.00 Firing order : 1-5- 3- 6- 2- 4

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 9.00...12.00 & maximum rack tra: 21.00 Difference ° CS : 3.00...4.00

BASIC SETTING

1st speed rpm: 1150

Rack travel in mm : 11.30...11.40

Del.quantity cm3/: 8.6...8.7

100 s: (8.4...8.9)

Spread cm3 : 0.3

100 s: (0.5)

2nd speed rpm : 350.0 Rack travel in mm : 5.9...6.1 Del.quantity cm3/ : 1.2...1.6

100 s: (1.0...1.8)

cm3 : 0.2

Spread 100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 rpm : 800

Rack travel in mm: 0.30...1.00

Governor spring pre-tension Click setting x : 4.50

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1150

: 86.5...87.5 Del.quantity 1000 : (84.5...89.5)

: 3.00 Spread cm3

1000 : (5.00)

RATED SPEED

1st version

Control lever position degrees: 95...103 Testing: 1st rack travel in: 10.30 rpm : 1190...1200 Speed 2nd rack travel in: 4.00 rpm : 1255...1285 Speed 4th rack travel in: 1450 rpm : 0.30...1.70Speed LOW IDLE 1 Control Lever position degrees: 70...78 Setting point w/out bumper spring : 350 rom Rack travel in mm: 5.5 Testing: rpm : 100 Speed Minimum rack trave: 19.00 rpm : 350 Speed Rack travel in mm : 5.90...6.10 Rack travel in mm : 2.00 rpm : 575...635 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1150 Rack travel in m: 11.30...11.40 2nd speed rpm : 500 Rack travel in m: 11.90...12.10 4th speed rpm : 800 Rack travel in m: 11.60...11.80 FUEL DELIVERY CHARACTERISTICS 1st version rpm : 500 Speed Del.quantity cm3/: 84.5...86.5 1000 s: (82.0...89.0) rpm : 800 Speed Del.quantity cm3/: 86.0...88.0 1000 s: (83.5...90.5) **BREAKAWAY** 1st version 1mm rack travel less than

full load rack tr: 10.30

rpm : 1190...1200 Speed

STARTING FUEL DELIVERY

: 100 Speed rpm

Rack travel in mm : 19.00...21.00

# LOW IDLE

rpm : 350 Speed Rack travel in mm : 5.90...6.10 Del.quantity cm3/: 12.5...16.5 1000 s: (10.5...18.5) Spread cm3 : 2.50

1000 s: (4.50)

Remarks:

: VALMET

**APPLICATION** 

Tractor (tractor engines)

A25

Note remarks

: MB 6,9 g 4 : 03.07.90 Test sheet Edition

Replaces

Test oil : ISO-4113

Combination no. : 9 400 085 317

Injection pump

Pump designation : PES6A95D41ORS2772 EP type number : 9 400 084 018

Governor

: RQV300...1300AB1066-Governor design.

: 9 420 080 265 Governer no.

Customer-spec. information

: MERCEDES-BENZ Customer

: OM 366 A Engine

: 125.0 : 2600 1st version kW Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 006

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Openina

pressure, bar : 172...175

Test lines : 1 680 750 015

Outside diameter x Wall thickness

x Length mm : 6.00x1.50x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 3.20...3.30 Prestroke mm

: (3.15...3.35)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 11

BASIC SETTING

1st speed rpm: 1300

Rack travel in mm : 10.40...10.50

Del.guantity cm3/: 8.9...9.1

100 s: (8.7...9.3)

Spread cm3 : 0.3

100 s: (0.6)

rpm : 300.0 2nd speed Rack travel in mm: 6.9...7.1

Del.quantity cm3/: 0.8...1.4 100 s: (0.6...1.6)

cm3 : 0.3 Spread 100 s: (0.5)

(B) Setting of injection pump

with governor

GUIDE SLEEVE TRAVEL

rpm : 300 1st speed : 0.80...1.30

travel mm 2nd speed : 500 rpm

: 2.30...2.80 travel mm

3rd speed rpm : 750

travel mm : 4.10...4.30

1500 4th speed rpm

: 8.50...8.60 travel mm

GUIDE SLEEVE POSITION

Control-lever position

Degree: -1 rpm : 1500

Speed Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1300 Speed Aneroid pressure h: 700

: 89.0...91.0 Del quantity

1000 : (87.0...93.0)

: 3.50 Spread cm3

> : (6.00) 1000

#### RATED SPEED

1st version Control lever

position degrees: 105...113

Testing:

1st rack travel in: 9.40

rpm : 1340...1350 Speed

2nd rack travel in: 4.00

Speed rpm : 1460...1490 4th rack travel in: 1630

rpm : 0.00...1.00 Speed

LOW IDLE 1 Control Lever

position degrees: 62...70

Testing:

: 100 Speed rpm Minimum rack trave: 8.00 rpm : 300 Speed

Rack travel in mm : 6.90...7.10

CONSTANT REGULATION

rpm : 420...550 Speed

TORQUE CONTROL

Torque control curve - 1st version

1st speed rpm : 1300

Rack travel in m: 10.40...10.50

rpm : 800 2nd speed

Rack travel in m: 10.90...11.00

rpm : 1000 4th speed

Rack travel in m: 10.60...10.80

Aneroid/Altitude Compensator Test

1st version

Setting

Speed : 500 rpm hPa : 700 Pressure

Rack travel mm : 10.90...11.00

Measurement

 $1/\min : 500$ Speed

1st pressure hPa : -

Rack travel in m: 9.50...9.70

2nd pressure hPa : 450

Rack travel in m: 10.50...10.60

3rd pressure hPa : 300

Rack travel in m: 9.80...10.00

START CUT-OUT

1/min: 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 700 rpm : 800 Speed

Del.quantity cm3/: 86.0...89.0 1000 s: (83.5...91.5)

rpm : 1000 Speed

Del.quantity cm3/: 88.0...91.0 1000 s: (85.5...93.5)

Aneroid pressure h: -

Speed rpm : 500 Del.quantity cm3/ : 59.0...61.0

1000 s: (57.0...63.0)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 9.40

Speed rpm : 1340...1350

STARTING FUEL DELIVERY

rpm : 100 Speed

Del.quantity cm3/: 95.0...115.0 1000 s: (-)

Rack travel in mm : 14.50...14.70

Remarks:

A27

Note remarks

: MB 5,8 c : 03.07.90 Test sheet Edition

Replaces

: ISO-4113 Test oil

Combination no. : 9 400 085 319

Injection pump

Pump designation : PES6A95D410RS2772 EP type number : 9 400 084 018

Governor

: RQV300...1400AB1066-Governor design.

10L

: 9 420 080 287 Governer no.

Customer-spec. information

Customer : MERCEDES-BENZ

: OM 352 A Engine

1st version kW : 141.0 : 2800 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 006

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

Test Lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 3.20...3.30 Prestroke mm

: (3.15...3.35)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1400

Rack travel in mm : 9.50...9.60

Del.quantity cm3/: 7.7...7.9

100 s: (7.5...8.1)

Spread cm3 : 0.3

100 s: (0.6)

rpm : 300.02nd speed

Rack travel in mm: 6.9...7.1 Del.quantity cm3/: 0.8...1.4

100 s: (0.6...1.6)

cm3 : 0.3Spread 100 s: (0.5)

(B) Setting of injection pump

with governor

GUIDE SLEEVE TRAVEL

rpm : 300 1st speed

: 0.80...1.30 travel mm

2nd speed rpm : 500

: 2.30...2.80 travel mm

: 750 3rd speed rpm

: 4.10...4.30 travel mm

: 1500 4th speed rpm

travel mm : 8.50...8.60

GUIDE SLEEVE POSITION

Control-lever position Degree: -1

rpm : 1500

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1400 Aneroid pressure h: 700

: 77.5...79.5

Del.quantity 1000

: (75.5...81.5) : 3.50 cm3

Spread 1000 : (6.00)

1/min : 220 (240) Speed RATED SPEED FUEL DELIVERY CHARACTERISTICS 1st version Control lever 1st version position degrees: 106...114 Aneroid pressure h: 700 : 800 Testina: Speed rpm Del.quantity cm3/: 74.0...77.0 1000 s: (71.5...79.5) Aneroid pressure h: 700 1st rack travel in: 8.50 rpm : 1440...1450 Speed 2nd rack travel in: 4.00 rpm : 1520...1550 rpm : 1000 Speed Speed Del.quantity cm3/: 77.5...80.5 4th rack travel in: 1650 1000 s: (75.0...83.0) rpm : 0.00...1.00Speed Aneroid pressure h: rpm : 500 LOW IDLE 1 Speed Del.quantity cm3/: 41.0...43.0 1000 s: (39.0...45.0) Control lever position degrees: 63...71 Testing: rpm : 100 BREAKAWAY Speed Minimum rack trave: 8.00 rpm : 300 1st version Rack travel in mm : 6.90...7.10 1mm rack travel less than CONSTANT REGULATION full load rack tr: 8.50 rpm : 1440...1450 Speed rom : 420...550 Speed TORQUE CONTROL STARTING FUEL DELIVERY Dimension a mm : 0.50 Torque control curve - 1st version rpm : 1400 : 100 Speed 1st speed rpm Del.quantity cm3/: 70.0...90.0 Rack travel in m: 9.50...9.60 rpm : 800 1000 s: (67.0...93.0) 2nd speed Rack travel in m: 10.00...10.10 4th speed rpm : 1000 Rack travel in mm : 12.90...13.10 Rack travel in m: 9.70...9.90 Remarks: Aneroid/Altitude Compensator Test 1st version Setting Speed : 500 rpm hPa : 700 Pressure : 10.00...10.10 Rack travel mm Measurement Speed  $1/\min : 500$ 1st pressure hPa : -Rack travel in m: 8.20...8.50 2nd pressure hPa : 330 Rack travel in m: 9.70...9.80
3rd pressure hPa : 170 Rack travel in m: 9.00...9.20

START CUT-OUT

Note remarks

Test sheet : FOR 7,8 h
Edition : 03.07.90
Replaces : 24.11.89
Test oil : ISO-4113

Combination no. : 9 400 087 416

Injection pump

Pump designation : PES6P110A720RS3226 EP type number : 9 400 087 066

Governor

Governor design. : RQV350...1000PA863-8

Governer no. : 9 420 080 271

Customer—spec. information Customer : FORD (FNH)

Engine : 7,8 L TC

1st version kW : 160.0 Rated speed : 2000

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 9 401 087 403

Inlet press., bar: 1.50

Test nozzle holder

assembly : 1 688 901 017

Openina

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test Lines : 1 468 750 015

Outside diameter x Wall thickness

x Length mm : 6.00X1.50X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 4.55...4.65 : (4.50...4.70)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance  $+ - \circ : 0.50 (0.75)$ 

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1000

Rack travel in mm : 12.70...12.80

Del.quantity cm3/: 13.8...14.0

100 s: (13.6...14.2)

Spread cm3: 0.5

100 s: (0.9)

2nd speed rpm : 350.0

Rack travel in mm : 6.9...7.1 Del.quantity cm3/ : 2.7...3.1

100 s: (2.5...3.4)

Spread cm3 : 0.3

100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 1200

travel mm : 9.30...9.70 2nd speed rpm : 1000

travel mm : 6.90...7.10

3rd speed rpm : 500

travel mm : 2.20...3.00

4th speed rpm : 350

travel mm : 1.40...1.70

5th speed rpm : 250

travel mm : 0.50...1.10

GUIDE SLEEVE POSITION

Control-lever position
Degree: -1

Speed rpm : 1220

Rack travel in mm : 7.00...9.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm: 1000 Aneroid pressure h: 900

Del.quantity : 138.0...140.0 1000 : (136.0...142.0) : 5.00 Spread cm31000 : (9.00) RATED SPEED 1st version Control lever position degrees: 105...113 Testina: 1st rack travel in: 11.70 rpm : 1055...1065 Speed 2nd rack travel in: 4.00 Speed rpm : 1145...1175 4th rack travel in: 1250 rom : 0.00...1.00Speed LOW IDLE 1 Control lever position degrees: 74...82 Testing: Speed rom : 100 Minimum rack trave: 12.00 rpm : 350 Speed Rack travel in mm : 6.90...7.10 CONSTANT REGULATION rpm : 390...460 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1000 Rack travel in m: 12.70...12.80 2nd speed rpm : 700 Rack travel in m: 14.00...14.10 3rd speed rpm : 850 Rack travel in m: 13.30...13.50 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm Pressure hPa : 900 : 14.00...14.10 Rack travel mm Measurement  $1/\min : 500$ Speed 1st pressure hPa : -Rack travel in m: 10.60...10.90 2nd pressure hPa : 405

Rack travel in m: 11.30...11.40

Rack travel in m: 13.00...13.30

3rd pressure hPa : 695

START CUT-OUT 1/min: 290 (310) Speed FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 900 Speed rpm : 700 Del.quantity cm3/ : 153.0...157.0 1000 s: (151.0...155.0) Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 84.0...86.0 1000 s: (82.0...88.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 11.70 rpm : 1055...1065 Speed STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 135.0...155.0 1000 s: (130.0...160.0) Rack travel in mm : 20.00...21.00 LOW IDLE rpm : 350 Speed Rack travel in mm : 6.90...7.10

Del.quantity cm3/: 27.5...31.5 1000 s: (25.0...34.0) cm3 : 3.50 Spread

1000 s: (5.50)

Remarks:

Delivery-valve spring pre-tension 3.0...3.2 mm.

Set shutoff stop 1.5...2.0 mm before shutoff.

Note remarks

: FOR 7,8 i 1 Test sheet : 03.07.90 Edition

Replaces

: ISO-4113 Test oil

Combination no. : 9 400 087 417

Injection pump

Pump designation : PES6P120A720RS3234

: 9 400 087 068 EP type number

Governor

: RQV350...1150PA923K Governor design.

: 9 420 080 272 Governer no.

Customer-spec. information : FORD (FNH) Customer

: 7.8 Ltr Engine

: 141.7 1st version kW : 2300 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 072

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 70...80

Test nozzle holder

: 1 688 901 101 assembly

Opening

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

: 1 680 750 008 Test Lines

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.35...2.45 Prestroke mm

(2.30...2.50)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

rpm: 1150 1st speed

Rack travel in mm : 12.20...12.30

Del.guantity cm3/: 14.4...14.6

100 s: (14.1...14.9)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 350.0 2nd speed

Rack travel in mm : 5.4...5.6 Del.quantity cm3/ : 2.6...3.2

100 s: (2.4...3.4) cm3 : 0.5

Spread 100 s: (0.8)

(B) Setting of injection pump

with governor

GUIDE SLEEVE TRAVEL

rpm : 1200 1st speed

: 9.50...9.70 travel mm

2nd speed rpm : 1000

travel mm : 7.80...8.00

: 800 3rd speed rpm

: 6.40...6.80 travel mm

: 450 4th speed rpm

: 3.50...3.70 travel mm

: 350 5th speed rpm

: 2.00...2.30 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1150 Speed

Aneroid pressure h: 900

Del.quantity : 144.5...146.5

1000 : (141.5...149.5)

cm3 : 5.00 1000 : (9.00) Spread RATED SPEED 1st version Control lever position degrees: 60...68 Testina: 1st rack travel in: 11.20 rpm : 1210...1220 Speed 2nd rack travel in: 4.00 Speed rpm : 1315...1345 4th rack travel in: 1400 rpm : 0.00...1.00 Speed LOW IDLE 1 Control lever position degrees: 10...18 Testing: : 275 Speed rom Minimum rack trave: 7.20 : 350 Speed rom Rack travel in mm : 5.40...5.60 CONSTANT REGULATION rpm : 390...460 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1150 Rack travel in m: 12.20...12.30 2nd speed rpm : 750 Rack travel in m: 11.10...11.30 3rd speed rpm : 650 Rack travel in m: 10.60...11.00 Aneroid/Altitude Compensator Test 1st version Setting : 1150 Speed rpm Pressure hPa : 900 : 12.20...12.30 Rack travel mm Measurement 1/min: 1150 Speed 1st pressure hPa : -Rack travel in m: 8.40...8.80 2nd pressure hPa : 290 Rack travel in m: 9.50...9.60 3rd pressure hPa : 440 Rack travel in m: 11.10...11.50

Speed 1/min: 290 (310) FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 900 rpm : 750 Speed Del.quantity cm3/: 151.0...157.0 1000 s: (148.0...160.0) cm3 : 8.00Spread 1000 s: (12.0) Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 116.0...120.0 1000 s: (114.0...122.0) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 11.20 rpm : 1210...1220 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 135.0...175.0 1000 s: (131.0...179.0) Rack travel in mm : 10.70...11.50 LOW IDLE Speed rpm : 350 Rack travel in mm : 5.40...5.60 Del.quantity cm3/ : 26.5...32.5 1000 s: (24.5...34.5) cm3 : 5.00Spread 1000 s: (8.00) Remarks: Set shutoff stop 1.5...2.0 mm before shutoff.

Note remarks

Test sheet : FOR 7,8 i Edition : 03.07.90

Replaces

: ISO-4113 Test oil

Combination no. : 9 400 087 419

Injection pump

Pump designation : PES6P120A720RS3234

EP type number : 9 400 087 068

Governor

Governor design. : RQV350...1150PA923-2

: 9 420 080 274 Governer no.

Customer-spec. information : FORD (FNH) Customer

: 7.8 Ltr Engine

: 156.6 : 2300 1st version kW Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 072

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 85...95

Test nozzle holder

: 1 688 901 101 assembly

Opening.

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 2.35...2.45 : (2.30...2.50) Rack travel in mm : 9.00...12.00 Firing order : 1-5-3-6-2-4

Phasina : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1150

Rack travel in mm : 12.50...12.60

Del.quantity cm3/: 14.6...14.8

100 s: (14.3...15.1)

Spread cm3 : 0.5

100 s: (0.9)

2nd speed rpm : 350.0 Rack travel in mm : 5.4...5.6

Del.quantity cm3/: 2.6...3.2 100 s: (2.4...3.4)

cm3 : 0.5 Spread 100 s: (0.8)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 1200

: 9.50...9.70 travel mm

: 1000 2nd speed rpm

: 7.80...8.00 travel mm

3rd speed : 800 rpm

travel mm : 6.40...6.80

4th speed : 450 rpm

3.50...3.70 travel mm

5th speed rpm

: 350 : 2.00...2.30 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1150 Speed

Aneroid pressure h: 900

Del.quantity : 140.3...151.5)

cm3 : 5.00 1000 : (9.00) Spread RATED SPEED 1st version Control lever position degrees: 63...71 Testina: 1st rack travel in: 11.50 rpm : 1210...1220 Speed 2nd rack travel in: 4.00 rpm : 1305...1335 Speed 4th rack travel in: 1400 rpm : 0.00...1.00 Speed LOW IDLE 1 Control lever position degrees: 10...18 Testing: Speed rpm : 275 Minimum rack trave: 7.20 rpm : 350 Speed Rack travel in mm : 5.40...5.60 CONSTANT REGULATION rpm : 390...460 Speed TORQUE CONTROL Torque control curve - 1st version rpm : 1150 1st speed Rack travel in m: 12.50...12.60 rpm : 750 2nd speed Rack travel in m: 11.80...12.00 3rd speed rpm : 650 Rack travel in m: 11.20...11.60 Aneroid/Altitude Compensator Test 1st version Setting : 1150 Speed rpm hPa : 900 Pressure Rack travel mm : 12.50...12.60 Measurement 1/min: 1150 Speed

1st pressure hPa : -Rack travel in m: 8.20...8.60 2nd pressure hPa : 345 Rack travel in m: 9.40...9.50 3rd pressure hPa : 520 Rack travel in m: 11.30...11.70 START CUT-OUT **B07** 

Speed 1/min: 290 (310) FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 900 rpm : 750 Speed Del.quantity cm3/: 160.0...166.0 1000 s: (157.0...169.0) cm3 : 8.00Spread 1000 s: (12.0) Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 106.5...110.5 1000 s: (104.5...112.5) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 11.50 rpm : 1210...1220 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 145.0...185.0 1000 s: (141.0...189.0) Rack travel in mm : 11.20...12.00 LOW IDLE

Speed rpm: 350
Rack travel in mm: 5.40...5.60
Del.quantity cm3/: 26.5...32.5 1000 s: (24.5...34.5) cm3 : 5.00

Spread 1000 s: (8.00)

Remarks:

Set shutoff stop 1.5...2.0 mm before shutoff.

# Note remarks

Test sheet : FOR 7,8 i 2 : 03.07.90 Edition

Replaces

Test oil : ISO-4113

: 9 400 087 420 Combination no.

Injection pump

Pump designation : PES6P120A720RS3234

EP type number : 9 400 087 068

Governor

: RQV350...1150PA923-3 Governor design.

: 9 420 080 275 Governer no.

Customer-spec. information Customer : FORD (FNH)

: 7.8 Ltr Engine

: 167.8 : 2300 1st version kW Rated speed

# TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 072

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 70...80

Test nozzle holder

: 1 688 901 101 assembly

Opening |

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test Lines : 1 680 750 008

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.35...2.45 Prestroke mm

: (2.30...3.50) Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

# BASIC SETTING

rpm: 1150 1st speed

Rack travel in mm : 13.40...13.50

Del.guantity cm3/: 15.8...16.0

100 s: (15.5...16.3)

cm3 : 0.5Spread

100 s: (0.9)

2nd speed rpm : 350.0 Rack travel in mm: 5.4...5.6 Del.quantity cm3/: 2.6...3.2 100 s: (2.4...3.4)

cm3 : 0.5Spread 100 s: (0.8)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 1200 1st speed

: 9.50...9.70 travel mm

: 1000 2nd speed **MCC** 

: 7.80...8.00 travel mm

: 800 3rd speed man

: 6.40...6.80 travel mm : 450 4th speed rpm

: 3.50...3.70 travel mm

5th speed : 350 rpm

: 2.00...2.30 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1150 Speed

Aneroid pressure h: 900

Del.quantity : 130.3...163.5)

cm3 : 5.00 1000 : (9.00) Spread 1/min : 290 (310) Speed FUEL DELIVERY CHARACTERISTICS RATED SPEED 1st version 1st version Control lever Aneroid pressure h: 900 position degrees: 62...70 rpm\_ : 750 Speed Del.guantity cm3/: 161.5...167.5 Testina: 1000 s: (158.5...170.5) 1st rack travel in: 12.40 rpm : 1210...1220 Speed Spread cm3 : 8.002nd rack travel in: 4.00 1000 s: (12.0) Speed rpm : 1335...1365 4th rack travel in: 1450 Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 108.5...112.5 rpm : 0.00...1.00 Speed 1000 s: (106.5...114.5) LOW TDLE 1 Control lever position degrees: 10...18 **BREAKAWAY** 1st version Testing: 1mm rack travel less than Speed rpm Minimum rack trave: 7.20 rpm : 350 full load rack tr: 12.40 Speed rpm : 1210...1220 Rack travel in mm : 5.40...5.60 Speed CONSTANT REGULATION STARTING FUEL DELIVERY rpm : 390...460 Speed rpm : 100 TORQUE CONTROL Speed Del.quantity cm3/: 140.0...180.0 1000 s: (138.0...182.0) Torque control curve - 1st version rpm : 1150 1st speed Rack travel in m: 13.40...13.50 Rack travel in mm : 11.10...11.90 rpm : 750 2nd speed Rack travel in m: 11.90...12.10 LOW IDLE 3rd speed rpm : 650 Rack travel in m: 11.40...11.80 rpm : 350 Speed Rack travel in mm : 5.40...5.60 Del.quantity cm3/: 26.5...32.5 Aneroid/Altitude 1000 s: (24.5...34.5) Compensator Test cm3 : 5.00 Spread 1000 s: (8.00) 1st version Setting Remarks: : 1150 Speed rom Pressure hPa : 900 Rack travel mm : 13.40...13.50 Set shutoff stop 1.5...2.0 mm before shutoff. Measurement Speed 1/min: 1150 1st pressure hPa : -Rack travel in m: 8.30...8.70 2nd pressure hPa : 320 Rack travel in m: 9.70...9.80 3rd pressure hPa : 525

START CUT-OUT

Rack travel in m: 11.90...12.30

Note remarks

: FOR 6,6 n : 03.07.90 Test sheet Edition

Replaces

: ISO-4113 Test oil

: 9 400 087 421 Combination no.

Injection pump

Pump designation : PES6P100A720RS3235 : 9 400 087 067

EP type number

Governor : RQV350...1300PA923-4 Governor design.

: 9 420 080 276 Governer no.

Customer—spec. information : FORD (FNH) Customer

: 6.6 Ltr Engine

: 125.0 1st version kW : 2600 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 072

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 85...95

Test nozzle holder

: 1 688 901 101 assembly

Opening 1

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 3.45...3.55

: (3.40...3.60)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1300

Rack travel in mm : 14.90...15.00

Del.quantity cm3/: 14.4...14.6

100 s: (14.1...14.9)

cm3 : 0.5Spread

100 s: (0.9)

2nd speed rpm : 350.0 Rack travel in mm: 6.5...6.7

Del.quantity cm3/: 1.4...2.0 100 s: (1.2...2.2)

Spread cm3 : 0.5100 s: (0.8)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 1300

9.20...9.40 travel mm

: 600 2nd speed rpm

: 4.80...5.10 travel mm

3rd speed : 450 rpm

: 3.60...3.90 travel mm

: 350 4th speed rpm

2.00...2.20 275 travel mm

5th speed rpm

: 0.70...1.10 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1300Speed

Aneroid pressure h: 1200

Del.quantity : 144.0...149.0)

cm3 : 5.00 1000 : (9.00) Spread RATED SPEED 1st version Control lever position degrees: 62...70 Testing: 1st rack travel in: 14.00 rpm : 1360...1370 Speed 2nd rack travel in: 4.00 Speed rpm : 1500...1530 4th rack travel in: 1600 Speed rpm : 0.00...1.00 Speed LOW IDLE 1 Control lever position degrees: 13...21 Testing: Speed : 275 ווומרו Minimum rack trave: 8.50 rpm : 350 Speed Rack travel in mm : 6.50...6.70 CONSTANT REGULATION rpm : 390...460 Speed TORQUE CONTROL Torque control curve - 1st version rpm : 1300 1st speed Rack travel in m: 14.90...15.00 rpm : 850 2nd speed Rack travel in m: 12.80...13.00 rpm : 550 3rd speed Rack travel in m: 11.50...11.90 Aneroid/Altitude Compensator Test 1st version Setting Speed : 1300 rpm hPa : 1200 Pressure Rack travel mm : 14.90...15.00 Measurement 1/min: 1300 Speed

1st pressure hPa : -Rack travel in m: 9.30...9.70 2nd pressure hPa : 375

Rack travel in m: 10.90...11.00 3rd pressure hPa : 715 Rack travel in m: 13.50...13.90

START CUT-OUT

1/min : 290 (310) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 1200 rpm : 850

Del.quantity cm3/: 132.0...138.0 1000 s: (129.0...141.0)

cm3 : 8.00Spread 1000 s: (12.0)

Aneroid pressure h: -

Speed rpm: 500 Del.quantity cm3/: 86.0...90.0 1000 s: (84.0...92.0)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 14.00

rpm : 1360...1370 Speed

STARTING FUEL DELIVERY

: 100 Speed rpm

Del.quantity cm3/: 140.0...180.0 1000 s: (138.0...182.0) Rack travel in mm: 13.10...13.90

LOW IDLE

Speed rpm : 350 Rack travel in mm : 6.50...6.70

Del.quantity cm3/: 14.0...20.0 1000 s: (12.0...22.0)

cm3 : 5.00Spread 1000 s: (8.00)

Remarks:

Set shutoff stop 1.5...2.0 mm before

shutoff.

Note remarks

Test sheet : FOR 7,8 i : 03.07.90 Edition

Replaces

: ISO-4113 Test oil

: 9 400 087 426 Combination no.

Injection pump

Pump designation : PES6P110A720RS3259

: 9 400 087 069 EP type number

Governor

Governor design. : RSV650...1250P8A530-

: 9 420 082 327 Governer no.

Customer-spec. information : FORD (FNH) Customer

Engine : 7.8 L

1st version kW : 190.0 Rated speed : 2500

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 017 assembly

Opening |

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 4.25...4.35 : (4.20...4.40) Prestroke mm

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

Phasina : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 9.00...12.00

& maximum rack tra: 21.00

Difference ° CS : 2.00...3.00

BASIC SETTING

1st speed rpm: 1200

Rack travel in mm : 12.10...12.20

Del.guantity cm3/: 16.2...16.4

100 s: (16.0...16.6)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 650.0 2nd speed Rack travel in mm: 6.5...6.7 Del.quantity cm3/: 2.2...2.6

100 s: (2.0...2.9)

cm3 : 0.3 100 s: (0.5) Spread

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800 Rack travel in mm: 0.30...1.00

Governor spring pre-tension Click setting x : 3.25

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1200 Aneroid pressure h: 1000

Del.quantity : 162.0...164.0 1000 : (160.0...166.0)

: 5.00 Spread cm3

1000 : (9.00)

RATED SPEED

1st version Control lever

position degrees: 98...106

Testing:

1st rack travel in: 11.10

rpm : 1260...1270 Speed

2nd rack travel in: 4.00 rpm : 1295...1315 Speed

3rd rack travel in: 4.00

rpm : 1310...1330 Speed 4th rack travel in: 1400

Speed rom : 0.30...1.70

LOW IDLE 1 Control lever

position degrees: 73...81

Setting point w/out bumper spring

rpm : 650 Speed Rack travel in mm : 6.1 : 650 Speed rpm

Rack travel in mm : 6.50...6.70

Rack travel in mm: 2.00

Speed rpm : 690...750

Aneroid/Altitude Compensator Test

1st version Settina

: 1200 Speed rpm

hPa : 1000 Pressure

Rack travel mm : 12.10...12.20

Measurement

Speed 1/min: 1200

1st pressure hPa : -

Rack travel in m: 9.20...9.30

2nd pressure hPa : 400

Rack travel in m: 9.70...9.80

3rd pressure hPa : 600

Rack travel in m: 11.40...11.70

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: rpm : 500 Speed

Del.quantity cm3/: 67.5...69.5

1000 s: (65.5...71.5)

BREAKAWAY

1st version

1mm rack travel less than

full load rack tr: 11.10

rpm : 1260...1270 Speed

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 140.0...170.0 1000 s: (136.0...174.0)

Rack travel in mm : 20.00...21.00

LOW IDLE

Speed rpm : 650

Rack travel in mm : 6.50...6.70 Del.quantity cm3/: 22.5...26.5

1000 s: (20.0...29.0)

cm3 : 3.50Spread

1000 s: (5.50)

Remarks:

APPLICATION

Combine-harvester

**B13** 

#### Note remarks

Test sheet : MB 6.9 i 1 Edition : 03.07.90

Replaces : -

Test oil : ISO-4113

Combination no. : 9 400 087 429

Injection pump

Pump designation : PES6P120A720RS3256

EP type number : 9 400 087 071

Governor

Governor design. : RQV300...1300PA963

Governer no. : 9 420 080 283

Customer-spec. information

Customer : MERCEDES-BENZ

Engine : OM 366 LA

1st version kW : 154.5 Rated speed : 2600

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 100...120

Test nozzle holder

assembly : 1 688 901 019

Opening

pressure, bar : 207...210

Orifice plate

diameter mm : 0,8

Test lines : 1 680 750 067

Outside diameter

x Wall thickness

x Length mm : 6.00X1.50X1000

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 4.30...4.40

: (4.25...4.45)
Rack travel in mm : 9.00...12.00

Firing order : 6-2-4-1-5-3

Phasing : 0-60-120-180-240-300

Tolerance  $+ - \circ : 0.50 (0.75)$ 

Time to cyl. no. : 6

BASIC SETTING

1st speed rpm: 1300

Rack travel in mm : 12.20...12.30

Del.quantity cm3/: 15.0...15.2

100 s: (14.7...15.5)

Spread cm3:0.5

100 s: (0.9)

2nd speed rpm : 300.0 Rack travel in mm : 8.8...9.2 Del.quantity cm3/: 1.4...2.0

100 s: (1.1...2.3)

Spread cm3 : 0.8 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm: 300

travel mm : 1.10...1.70

2nd speed rpm : 650

travel mm : 3.70...4.30

3rd speed rpm: 1060

travel mm : 5.60...6.10 th speed rpm : 1460

4th speed rpm : 1460 travel mm : 9.70...10.20

5th speed rpm : 1360

travel mm : 8.20...8.80

GUIDE SLEEVE POSITION Control-lever position

Degree: -2

Speed rpm: 1400

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version rpm : 1300 Speed Aneroid pressure h: 900 Del.quantity : 150.0....155.0) cm3 : 5.00 1000 : (9.00) RATED SPEED 1st version Control lever position degrees: 107...115 Testing: 1st rack travel in: 11.20 rpm : 1340...1350 Speed 2nd rack travel in: 4.00 rpm : 1410...1440 Speed LOW IDLE 1 Control lever position degrees: 78...86 Testing: Speed : 200 rpm Minimum rack trave: 10.70 rpm : 300 Rack travel in mm : 8.80...9.20 CONSTANT REGULATION rpm : 300...450 Speed Aneroid/Altitude Compensator Test 1st version Setting : 600 Speed rpm Pressure hPa : -: 9.80...10.00 Rack travel mm Measurement 1/min: 600 Speed 1st pressure hPa : 400 Rack travel in m: 10.50...10.70 2nd pressure hPa : 600 Rack travel in m: 11.70...11.90 START CUT-OUT Speed 1/min : 220 (240) FUEL DELIVERY CHARACTERISTICS 1st version

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 11.20 Speed rpm : 1340...1350

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 80.0...100.0 1000 s: (76.0...104.0)

Remarks:

:

Aneroid pressure h: 900

Note remarks

: MB 6,9 i : 03.07.90 Test sheet Edition

Replaces

Test oil : ISO-4113

: 9 400 087 430 Combination no.

Injection pump

Pump designation : PES6P120A720RS3256

EP type number : 9 400 087 071

Governor

: RQV300...1300PA963-1 : 9 420 080 284 Governor design.

Governer no.

Customer-spec. information

Customer : MERCEDES-BENZ

: OM 366 LA Engine

: 169.0 1st version kW Rated speed : 2600

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 100...120

Test nozzle holder

: 1 688 901 019 assembly

Openina .

pressure, bar : 207...210

Orifice plate

diameter mm : 0,8

Test lines : 1 680 750 067

Outside diameter x Wall thickness

: 6.00x1.50x1000 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 4.30...4.40 Prestroke mm

: (4.25...4.45)

Rack travel in mm : 9.00...12.00 Firing order : 6-2-4-1-5-3

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 6

BASIC SETTING

1st speed rpm : 1300

Rack travel in mm : 13.10...13.20

Del.quantity cm3/: 16.5...16.7

100 s: (16.2...17.0)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 300.0 2nd speed Rack travel in mm: 8.8...9.2

Del.quantity cm $3/:1.4...2.\overline{0}$ 100 s: (1.1...2.3)

cm3 : 0.8

Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 300 1st speed

travel mm : 1.10...1.70

2nd speed : 650 rpm

3.70...4.30 travel mm

1060 3rd speed rpm

: 5.60...6.10 travel mm

: 1460 4th speed non

: 9.70...10.20 travel mm

1360 5th speed rpin

: 8.20...8.80 travel mm

GUIDE SLEEVE POSITION

Control-Lever position

Degree: -2  $r\bar{p}m : 1\bar{4}00$ Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version rpm : 1300 Speed Aneroid pressure h: 900 : 165.0...167.0 Del.quantity 1000 : (162.9...170.0) cm3 : 5.00 Spread 1000 : (9.00) RATED SPEED 1st version Control Lever position degrees: 108...116 Testing: 1st rack travel in: 12.20 rpm : 1340...1350 Speed 2nd rack travel in: 4.00 rpm : 1420...1450 Speed LOW IDLE 1 Control lever position degrees: 78...86 Testing: Speed : 200 rpm Minimum rack trave: 10.70 rpm : 300 Rack travel in mm : 8.80...9.20 CONSTANT REGULATION rpm : 300...450 Speed Aneroid/Altitude Compensator Test 1st version Setting : 600 Speed rpm Pressure hPa : -: 10.30...10.50 Rack travel mm Measurement 1/min: 600 Speed 1st pressure hPa : 400 Rack travel in m: 11.00...11.20 2nd pressure hPa : 600 Rack travel in m: 12.20...12.40 START CUT-OUT 1/min: 220 (240) Speed FUEL DELIVERY CHARACTERISTICS

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 12.20 Speed rpm : 1340...1350

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/: 80.0...100.0

1000 s: (76.0...104.0)

Remarks:

:

1st version

Aneroid pressure h: 900

Note remarks

: CUM 8,3 b Test sheet Edition : 26.03.90 Replaces : 1.9.88 Test oil : ISO-4113

Combination no. : 9 400 230 103

Injection pump

Pump designation : PES6A100D320/3RS2691

: 9 410 230 028 EP type number

Governor

Governor design. : RQV350...1100AB1227R

: 9 420 231 015 Governer no.

Customer-spec. information Customer : CUMMINS

Engine : 6 CT 8.3

1st version kW : 156.6 Rated speed : 2200

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

assembly : 1 688 901 017

Opening

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.80...2.90 : (2.75...2.95) Prestroke mm

Rack travel in mm : 9.00...12.00 : 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance  $+ - \circ : 0.50 (0.75)$ 

Time to cyl. no. : 1

BASIC SETTING

rpm: 1100 1st speed

Rack travel in mm : 12.60...12.70

Del.quantity cm3/: 12.6...12.8

100 s: (12.4...13.0)

Spread cm3 : 0.4

100 s: (0.6)

2nd speed rpm : 350.0 Rack travel in mm : 5.4...5.6 Del.quantity cm3/: 1.8...2.2

100 s: (1.5...2.4) cm3 : 0.6

Spread 100 s: (0.8)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 1100

travel mm : 7.70...7.80

2nd speed rpm : 1150 travel mm

8.00...8.60 1290 3rd speed

rpm

9.50...10.10 travel mm

: 350 4th speed rpm

: 1.20...1.60 travel mm

5th speed : 600 rpm

travel mm : 3.90...4.50

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1100 Speed Aneroid pressure h: 900

Del.quantity : 126.5...128.5 1000 : (124.5...130.5)

cm3 : 4.00 Spread

1000 : (6.50)

RATED SPEED

1st version Control lever

position degrees: 57...65

Testing:

1st rack travel in: 11.60 rpm : 1145...1155 Speed

2nd rack travel in: 4.00

Speed rpm : 1260...1290 4th rack travel in: 1350

rpm : 0.00...1.00 Speed

LOW IDLE 1 Control lever

position degrees: 9...17 Speed rpm : 350

Rack travel in mm : 5.40...5.60

Aneroid/Altitude Compensator Test

1st version Setting

Speed : 500 rpm hPa : 900 Pressure

Rack travel mm : 12.60...12.70

Measurement

 $1/\min : 500$ Speed

1st pressure hPa :-

Rack travel in m: 10.10...10.30

2nd pressure hPa : 405

Rack travel in m: 10.90...11.00

3rd pressure hPa : 535 Rack travel in m: 11.80...12.20

START CUT-OUT

1/min: 260 (280) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: -

Speed rpm : 500 Del.quantity cm3/ : 79.0...83.0 1000 s: (77.0...85.0)

**BREAKAWAY** 

B19

1st version 1mm rack travel less than

full load rack tr: 11.60

Speed rpm : 1145...1155

STARTING FUEL DELIVERY

rpm : 100 Speed

Del.quantity cm3/: 165.0...185.0 1000 s: (160.0...190.0)

Rack travel in mm : 15.30...15.70

LOW IDLE

Speed rpm : 350

Rack travel in mm : 5.40...5.60 Del.quantity cm3/: 18.0...22.0 1000 s: (15.5...24.5)

cm3 : 6.00 Spread 1000 s: (8.00)

Remarks:

Set shutoff solenoid 0.5...1.5 mm before shutoff.

Start-of-delivery mark is at 7° after start of delivery.

#### Note remarks

: MB 6,9 0 83 : 17.05.90 Test sheet Edition : 16.02.90 Replaces Test oil : ISO-4113

Combination no. : 0 403 446 246

Injection pump

Pump designation : PES6MW100/720RS1144 EP type number : 0 413 406 138

Governor

: RQV300...1300MW50-6 Governor design.

: 0 420 083 209 Governer no.

Customer-spec. information Customer : MB-NFZ

: 0M366A Engine

: 125.0 1st version kW : 2600 Rated speed

#### TEST BENCH REQUIREMENTS

Test oil

: 38...42 inlet temp. °C

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina

: 172...175 pressure, bar

Test lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 30...32

: 3.70...3.80 Prestroke mm : (3.65...3.85)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

BASIC SETTING

1st speed rpm : 1300

Rack travel in mm : 11.00...11.10

Del.guantity cm3/: 7.7...7.9

100 s: (7.5...8.1)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.02nd speed Rack travel in mm: 8.0...8.2 Del.quantity cm3/: 0.9...1.3

100 s: (0.6...1.5)

cm3 : 0.3Spread 100 s: (0.5)

# (B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

: 1430 1st speed rpm

: 9.30...9.70 travel mm : 1340 2nd speed

rpm

8.50...8.70 travel mm 3rd speed : 500 rpm

: 2.70...3.30 : 300 travel mm

4th speed rpm

: 1.20...1.60 travel mm

# GUIDE SLEEVE POSITION

Control-lever position

Degree: -1

rpm : 1300 Speed

Rack travel in mm : 15.20...17.80

## FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1300 Speed Aneroid pressure h: 800

: 77.0...79.0 Del.quantity

1000 : (75.0...81.0) : 3.50 cm3 Spread

1000 : (6.00)

RATED SPEED

1st version Aneroid pressure h: 800 rpm : 800 Control Lever Speed Del.quantity cm3/: 76.0...78.0 1000 s: (74.0...80.0) position degrees: 108...116 cm3 : 5.00 Testina: Spread 1000 s: (7.0) 1st rack travel in: 10.00 rpm : 1340...1350 Aneroid pressure h: 800 Speed : 585 2nd rack travel in: 4.00 Speed rpm Speed rpm: 1425...1455 4th rack travel in: 1550 Del.quantity cm3/: 68.5...71.5 1000 s: (66.0...74.0) Speed rpm : 0.00...1.00Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 39.0...41.0 LOW IDLE 1 1000 s: (37.0...43.0) Control Lever position degrees: 78...86 Setting point w/out bumper spring Speed rpm : 300 BREAKAWAY Rack travel in mm: 8.1 1st version Testina: 1mm rack travel less than Speed : 100 rpm Minimum rack trave: 9.20 full load rack tr: 10.00 Speed rpm : 300 Rack travel in mm : 8.00...8.20 Speed rpm : 1340...1350 STARTING FUEL DELIVERY TORQUE CONTROL Dimension a mm : 1.20 Torque control curve - 1st version Speed rpm : 100 Del.quantity cm3/: 78.0...88.0 1000 s: (75.0...91.0) 1st speed rpm : 1300 Rack travel in m: 10.90...11.00 2nd speed rpm : 800 Rack travel in m: 11.80...12.00 LOW IDLE 3rd speed rpm : 585 Rack travel in m: 12.00...12.20 : 300 Speed rpm 4th speed rpm : 1100 Rack travel in m: 11.10...11.30 Rack travel in mm : 8.00...8.20 Del.quantity cm3/: 9.0...13.0 1000 s: (6.5...15.5) cm3 : 3.50 Aneroid/Altitude Spread 1000 s: (5.50) Compensator Test Remarks: 1st version : hPa : -Pressure Rack travel mm : 10.50...10.60 1st pressure hPa : 180 Rack travel in m: 10.90...11.00 2nd pressure hPa : 290 Rack travel in m: 11.70...12.00 3rd pressure hPa : 800 Rack travel in m: 12.00...12.20 START CUT-OUT 1/min: 230 (250) Speed FUEL DELIVERY CHARACTERISTICS 1st version

**B21** 

Note inst. in remarks column

Test sheet : CUM 3.9 P20 **Fdition** : 21.06.90

replaces

Calibrating oil : ISO 4113

: VE 4/12F1250 R359 Injection pump

: 0 460 424 054 Type number

Customer-specific information

Customer : CUM

Engine : 4BTA

TEST BENCH REQUIREMENTS

Calibrating oil return temp. °C

with thermometer: 40...48 : 42...50 electronically

Inlet press., bar: 0.35

Calibrating nozzle-holder

assembly : 1 688 901 027

Openina

bar : 0.35 pressure

Perforated-plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery block mm: 1.25 Piston stroke

mm: +0.02(0.06)

Outlet : A

Injection pump setting values Test specifications in parentheses

Timing device travel:

1/min: 1100 Speed Charge press. hPa: 1000 Setting value mm: 2.0...2.4

Supply-pump pressure:

1/min: 1100 Speed Charge press. hPa: 1000 Setting value bar: 5.1...6.1

Full-load del. with charge press.:

1/min: 850 Speed Charge press. hPa: 1000

Del.quantity cm3/ 1000H.: 83.0...84.0

cm3/: 4.0Dispersion 1000H: (4.5)

Full-load del. w/out charge press.:

1/min : 500

Del.quantity cm3/

1000H.: 53.0...54.0

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/

1000H.: 10.0...12.0

cm3/: 5.5Dispersion

1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1330 Charge press. hPa: 1000

Del.quantity cm3/ 1000H: 68.0...74.0

Start:

Speed 1/min: 100 Del.quantity cm3/1000H.: 80.0

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 400 1st speed

TD travel mm: 2.9...3.9

mm: (2.9...3.9)

1/min: 1000 2nd speed Charge press. hPa: 1000 TD travel mm: 0.9...1.7

mm: (0.6...2.0)

1/min: 1100 3rd speed Charge press. hPa: 1000

mm: 2.0...2.4 TD travel mm: (1.5...2.9) 1/min: 1250

4th speed Charge press. hPa: 1000

TD travel mm: 2.83.6 mm: (2.53.9)	+ Charge press. hPa: 1000 + Del.quantity cm3/: 83.084.0 + 1000H.: (80.586.5)
Supply-pump pressure characteristic:	8th speed 1/min: 700 Charge press. hPa: 535 Del.quantity cm3/: 71.572.5
1st speed 1/min: 500 Charge press. hPa: 1000	+ Del.quantity cm3/: 71.572.5 + 1000H: (68.076.0) + 9th speed 1/min: 500
Supply-pump pressure bar: 2.63.2 2nd speed 1/min: 1000	Del.quantity cm3/: 53.054.0 1000H: (49.557.5)
Charge press. hPa: 1000 Supply-pump	Zero delivery (stop):
pressure bar: 4.95.5  3rd speed 1/min: 1100  Charge press. hPa: 1000	Mech. shutoff:
Supply-pump pressure bar: 5.36.2 4th speed 1/min: 1250	+ Speed 1/min: 1250 - Del.quantity cm3/: 03 - 1000H.: -
Charge press. hPa: 1000 Supply-pump	Electr. shutoff:
pressure bar: 6.06.6	+ Speed 1/min: 375
Overflow quantity at overflow valve:	+ ELAB volt: - + Del.quantity cm3/: 0.03.0
1st speed 1/min: 500 Oveflow : 4183 quantity cm3/10s: (2698)	+ max. 1000H.: -  Idle delivery:
2nd speed 1/min: 1250 Charge press. hPa: 1000	1st speed 1/min: 375
Overflow : 55138 quantity cm3/10s: (40153)	+ Del.quantity cm3/: 1012.0 + 1000H.: (6.016.0)
Delivery-quant. and breakaway char.:	+ 2nd speed 1/min: 450 + Del.quantity cm3/: 0.02.0 + 1000H.: -
1st speed 1/min: 700 Charge-air pressure-setting	Automatic starting fuel delivery:
point hPa: 535 Del.quantity cm3/: 71.572.5 1000H.: (68.076.0)	1st speed 1/min: 130 Del.quantity cm3/: -
2nd speed 1/min: 1500 Charge press. hPa: 1000	† ind. 1000H: 80.0
Del.quantity cm3/: 0.03.0 1000H.: -	2nd speed 1/min: 250 Del.quantity cm3/: -
3rd speed 1/min: 1430 Charge press. hPa: 1000 Del.quantity cm3/: 15.055.0	max. 1000H: 40.0  Shutoff electromagnet:
1000H.: -	+
4th speed 1/min: 1330 Charge press. hPa: 1000 Del.quantity cm3/: 68.074.0	+ Cut-in + min. voltage : 10.0 + Rated voltage : 12.0
1000H.: (65.077.0) 5th speed	Mounting and assembly dimensions:
Del.quantity cm3/: 76.579.5 1000H.: (75.081.0)	Designation Mm : 3.7
6th speed 1/min: 1100 Charge press. hPa: 1000 Del.quantity cm3/: 77.580.5	+ MS mm : 0.81.2 + SVS max. mm : 2.1 + XK mm : 21.823.8
1000H.: (75.582.5) 7th speed 1/min: 850	+ XK mm : 21.823.8 + XL mm : 11.314.7 +

Remarks:

Operate control lever after each manifold-pressure compensator pressure change.

\* Correction at adjusting nut (66)

Heavy-duty fuel-injection pump for DI-engines: only test using timing-device-travel measuring device with metal jacket

Note inst. in remarks column

: CUM 3.9 P22 Test sheet Edition : 19.06.90

replaces

Calibrating oil : ISO 4113

: VE 4/12F1250 R374 Injection pump

: 0 460 424 057 Type number

Customer-specific information

Customer : CUM

: 4BTA 3.9 IND. Engine

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer : 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated plate

mm: 0.5 diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

mm : 0.3Prestroke

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.55

mm: +-0.02(0.06)

Outlet

Injection pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 850 Speed Charge press. hPa: 1000 Setting value mm: 4.0...4.4

Supply-pump pressure:

1/min: 850 Speed Charge press. hPa: 1000 Setting value bar: 5.6...6.2

Full-load del. with charge press.:

1/min: 850 Speed Charge press. hPa: 1000

Del.quantity cm3/ 1000H.: 85.5...86.5

cm3/: 4.0Dispersion 1000H: (4.5)

Full-load del. w/out charge press.:

 $1/\min : 500$ Speed Del.quantity cm3/

1000H.: 64.5...65.5

Low-idle speed regulation:

Speed 1/min: 365

Del.quantity cm3/

1000H .: 8.0...14.0

cm3/: 5.5 Dispersion

1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1310 Charge press. hPa: 1000

Del.quantity cm3/ 1000H: 61.0...67.D

Start:

1/min: 100 Speed cm3/1000H.: 70.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 500 1st speed Charge press. hPa: 1000

TD travel mm: 1.8...2.6

mm: (1.5...2.9) 1/min: 850

2nd speed Charge press. hPa: 1000

TD travel mm: 4.0...4.4 mm: (3.5...4.9)

1/min: 1100

3rd speed Charge press. hPa: 1000

TD travel mm: 4.95.7 mm: (4.66.0)	Charge press. hPa: 350 Del.quantity cm3/: 79.580.5
Supply-pump pressure characteristic:	1000H: (76.084.0) 9th speed
1st speed 1/min: 500 Charge press. hPa: 1000	1000H: (60.068.0)
Supply-pump - pressure bar: 4.04.6 -	Zero delivery (stop):
pressure bar: 4.04.6 - 2nd speed 1/min: 850 - Charge press. hPa: 1000 -	Mech. shutoff:
Supply-pump - pressure bar: 5.66.2 -	Speed 1/min: 1400 - Del.quantity cm3/: 03 - 1000H.: -
3rd speed 1/min: 1100 - Charge press. hPa: 1000 -	1000н.: —
Supply-pump - pressure bar: 6.77.3	Electr. shutoff:
Overflow quantity at overflow valve:	- Speed 1/min: 365 - ELAB volt: -
1st speed	- Del.quantity cm3/: 0.03.0 - max. 1000H.: -
Oveflow : 4183 - quantity cm3/10s: (2698) - 2nd speed 1/min: 1250 -	Idle delivery:
Charge press. hPa: 1000 Overflow: 55138	Mfg. date: until : - 1st speed  1/min: 365
quantity cm3/10s: (40153)	- Del.quantity cm3/: 8.014.0 1000H.: (6.016.0)
Delivery-quant. and breakaway char.:	- 2nd speed 1/min: 450 - Del.quantity cm3/: 0.04.0
1st speed 1/min: 700 - Charge-air pressure-setting	1000H.: -
point hPa: 350 Del.quantity cm3/: 79.581.5 1000H.: (76.084.0)	Automatic starting fuel delivery:
2nd speed 1/min: 1420	- 1st speed 1/min: 130 - ind. 1000H: 70.0
Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0	- - 2nd speed 1/min: 230
1000H.: - 3rd speed 1/min: 1350	- max. 1000H : 60.0
Charge press. hPa: 1000 Del.quantity cm3/: 15.055.0	Shutoff electromagnet:
1000H.: - 4th speed 1/min: 1310	- Cut-in - min. voltage : 10.0
Charge press. hPa: 1000 Del.quantity cm3/: 61.067.0	- Rated voltage : 12.0
1000H.: (58.070.0) + 5th speed 1/min: 1250 +	- Mounting and assembly dimensions: -
Charge press. hPa: 1000 pel.quantity cm3/: 74.577.5	- Designation - K mm : -
1000H.: (73.079.0) 6th speed 1/min: 1100	- KF mm : 5.05.4 - MS mm : 1.01.4
Charge press. hPa: 1000 pel.quantity cm3/: 77.080.0	- SVS max. mm : 2.4 - XK mm : 21.823.8
1000H.: (75.082.0) 7th speed 1/min: 850	- XL mm : 13.216.6
Charge press. hPa: 1000 + Del.quantity cm3/: 85.586.5	<ul><li>Remarks:</li><li>Operate control lever after each</li></ul>
1000H.: (83.089.0) 8th speed 1/min: 700	manifold pressure compensator pressure change.

\* Correction at adjusting nut (46)

Heavy-duty fuel-injection pump for DI-engines: only test using timing-device-travel measuring device with metal jacket

Note inst. in remarks column

: CUM 3.9 P21 Test sheet **Fdition** : 21.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 4/12F1250 R374 : 0 460 424 057 Type number

Customer Part-No.: 3 916 926

Customer-specific information

Customer : CUM

: 4BTA 3.9 IND. Engine

k: 88 Power 1/mi: 2500 Speed

TEST BENCH REQUIREMENTS

Calibrating oil return temp.

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated-plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke

e mm: 0.3 (from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.55

mm: +-0.02(0.06)

Outlet : A

Injection sump setting values Test specifications in parentheses Timing-device travel:

1/min: 850 Charge press. hPa: 1000 Setting value mm: 4.0...4.4

Supply-pump pressure:

1/min: 850 Speed Charge press. hPa: 1000 Setting value bar: 5.6...6.2

Full-load del. with charge press.:

Speed 1/min: 850 Charge press. hPa: 1000

Del.quantity cm3/

1000H.: 85.5...86.5

cm3/: 4.0Dispersion 1000H : (4.5)

Full-load del. w/out charge press.:

Speed  $1/\min : 500$ 

Del.quantity cm3/ 1000H.: 63.5...64.5

Full-load speed regulation:

Speed 1/min: 1310 Charge press. hPa: 1000

Del.quantity cm3/

1000H: 61.0...67.0

Start:

Speed 1/min: 100 Del.quantity cm3/1000H.: 70.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 500 1st speed Charge press. hPa: 1000 TD travel

mm: 1.8...2.6 mm: (1.5...2.9)

2nd speed 1/min: 850 Charge press. hPa: 1000 TD travel mm: 4.0...4.4

mm: (3.5...4.9)

3rd speed 1/min: 1100 Charge press. hPa: 1000 TD travel mm: 4.9...5.7

mn: (4.6...6.0)

Supply-pump pressure characteristic:

+	Del.quantity cm3/: 63.564.5
1st speed 1/min: 500	1000H: (60.068.0)
Charge press. hPa: 1000	
Supply-pump +	Zero delivery (stop):
pressure bar: 4.04.6	2010 00011017 1000071
2nd speed 1/min: 850	Mech. shutoff:
Charge press. hPa: 1000	redit. Siletoi it
	Speed 1/min: 1400
Supply-pump +	
pressure bar: 5.66.2  3rd speed 1/min: 1100	Del.quantity cm3/: 03
ora speed 1/min: 1100	1000н.: -
Charge press. hPa: 1000	met a la co
Supply-pump +	Electr. shutoff:
pressure bar: 6.77.3	
+	Speed 1/min: 365
Overflow quantity at overflow valve:	ELAB volt: -
+	Del.quantity cm3/: 0.03.0
1st speed 1/min: 500	max. 1000H.: -
Oveflow : 4183	
quantity cm3/10s: (2698)	Idle delivery:
2nd speed 1/min: 1250 +	2000 1001/0
Charge press. hPa: 1000	1st speed 1/min: 365
Overflow : 55138	Del.quantity cm3/: 8.014.0
	1000H.: (6.016.0)
quantity cm3/10s: (40153)	
7	2nd speed 1/min: 450
Delivery quant. and breakaway char.:	Del.quantity_cm3/: 0.04.0
†	1000H.: -
1st speed 1/min: 700	
Charge-air pressure setting +	Automatic starting fuel delivery:
point hPa: 350 +	
Del.quantity cm3/: 79.580.5	1st speed 1/min: 130
1000H.: (76.084.0)	Del.quantity cm3/: -
2nd speed 1/min: 1420 +	ind. 1000H: 70.0
Charge press. hPa: 1000	
Del.quantity cm3/: 0.03.0	2nd speed 1/min: 230
Del.quantity cm3/: 0.03.0	Del.quantity cm3/: -
3rd speed 1/min: 1350 +	max. 1000H: 60.0
Charge press. hPa: 1000	man, to the same of the same o
Del.quantity cm3/: 15.055.0	Shutoff electromagnet:
1000H.: -	oracorr eceder orings lee.
4th speed 1/min: 1310	Cut-in
Charge press. hPa: 1000	min. voltage : 10.0
Charge press. Hra. 1000	
Del.quantity cm3/: 61.067.0 + 1000H.: (58.070.0)	Rated voltage : 12.0
	Marmatus and appealing dimensions.
5th speed 1/min: 1250	Mounting and assembly dimensions:
Charge press. hPa: 1000	A = 0 \$ 6 \$
Del.quantity cm3/: 75.576.5	Designation
1000H.: (73.079.0)	K mm:-
6th speed 1/min: 1100 +	KF mm : 5.05.4
Charge press. hPa: 1000	MS mm : 1.01.4
Del.quantity cm3/: 77.080.0 +	SVS max. mm : 2.4
1000H.: (75.082.0) +	XK mm : 21.823.8
7th speed 1/min: 850 +	XL mm : 13.216.6
Charge press. hPa: 1000	
Del.quantity cm3/: 85.586.5	Remarks:
1000H.: (83.089.0)	rimitimal 1966 s
8th speed 1/min: 700	Operate control lever after each
Charge press. hPa: 350	manifold-pressure compensator pressure
Del.quantity cm3/: 79.581.5	
	change.
1000H: (76.084.0)	A Parantina at adjustica and (11)
9th speed 1/min: 500 +	* Correction at adjusting nut (46)

Heavy-duty fuel-injection pump for DI-engines: only test using timing-device-travel measuring device with metal jacket

Note inst. in remarks column

: CUM 3.9 P24 Test sheet : 21.06.90 Edition

replaces

Calibrating oil : ISO 4113

Injection pump : VE 4/12F1150 R378

Type number : 0 460 424 058 Customer Part-No. : 3 717 508

Customer-specific information

Customer : CUM

: 4BT 3.9 IND. Engine

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 : 42...50 electronically

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening |

bar: 250...253 pressure

Perforated-plate

diameter mm: 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

mm:0.3Prestroke

(from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.8

mm: +-0.02(0.06)

Outlet

Injection many setting values Test specifications in parentheses

Timing-device travel:

Speed 1/min: 900 Setting value mm: 2.0...2.4

Supply-pump pressure:

1/min: 900 Setting value bar: 4.2...4.8

Full-load del. w/out charge press.:

1/min: 900 Speed

Del.quantity cm3/ 1000H.: 67.0...68.0

cm3/: 4.0 Dispersion 1000H .: (4.5)

Low-idle speed regulation:

Speed 1/min: 375

Del.quantity cm3/

1000H.: 8.0...14.0 cm3/: 5.5

Dispersion 1000H.: (7.0)

Full-load speed regulation:

1/min: 1190 Speed

Del.quantity cm3/ 1000H: 47.0...53.0

Start:

1/min: 100 Speed Del.quantity

mind cm3/1000H.: 70.0

Inspection pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 750 1st speed

mm: 1.8...2.6 mm: (0.5...1.9) 1/min: 900 TD travel

2nd speed

mm: 2.0...2.4 TD travel

mm: (1.5...2.9)

1/min: 1150 3rd speed

mm: 3.2...4.0 mm: (2.9...4.3) TD travel

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 2.5...3.1 pressure

1/min: 900 2nd speed

Supply-pump

bar: 4.2...4.8 pressure 1/min: 1150 3rd speed

C03

Supply-pump bar: 5.2...5.8 pressure Overflow quantity at overflow valve: 1/min: 500 1st speed : 41...83 Oveflow cm3/10s: (26...98) quantity 1/min: 1150 2nd speed : 55...138 Overflow quantity cm3/10s: (40...153) Delivery-quant, and breakaway char.: 1/min: 1300 1st speed Del.quantity cm3/: 0.0...3.0 1000H.: -1/min: 1220 2nd speed Del.quantity cms/: 1000H.: cm3/: 15.0...55.0 3rd speed 1/min: 1190 Del.quantity cm3/: 47.0...56.0) 1/min: 1150 4th speed cm3/: 63.5...66.5 Del.quantity 1000H.: (62.0...68.0) 1/min: 900 5th speed 1/min: 750 6th speed Del.quantity cm3/: 69.5...73.5 1000H.: (67.5...75.5) 1/min: 500 7th speed Del.quantity cm3/: 68.0...76.0 1000H.: (66.0...78.0) Zero delivery (stop): Mech. shutoff: Speed 1/min: 1150 Del.quantity cm3/: 0..3 1000H .: -Electr. shutoff: Speed 1/min: 375 ELAB volt: -Del.quantity cm3/: 0.0...3.0 1000H.: max. Idle delivery: 1st speed 1/min: 375 1/min: 500 2nd speed Del.quantity cm3/: 0.0...4.0 1000H.: -

Automatic starting fuel delivery:

1st speed 1/min: 130 Del.quantity cm3/: ind. 1000H: 80.0

2nd speed 1/min: 240 Del.quantity cm3/: max. 1000H: 80.0

Shutoff electromagnet:

Cut-in

min. voltage : 10.0 Rated voltage : 12.0

Mounting and assembly dimensions:

Designation

K mm : KF mm : 5.0...5.4
MS mm : 1.1...1.3
SVS max. mm : 4.0

Remarks:

Heavy-duty fuel-injection pump for DI-engines: only test using timing-device-travel measuring device with metal jacket

Note inst. in remarks column

Test sheet Edition : CUM 3.9 P25 : 21.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 4/12F1150 R378

Type number : 0 460 424 058 Customer Part-No. : 3 917 508

Customer-specific information

: CUM Customer

: 48T 3.9 IND. Engine

TEST BENCH REQUIREMENTS

Calibrating-oil

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening.

pressure bar: 250...253

Perforated plate

diameter mm: 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke

e mm: 0.3 (from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.8

mm: +-0.02(0.06)

Outlet

Injection pump setting values Test specifications in parentheses

Timing-device travel:

Speed 1/min: 900 Setting value mm: 2.0...2.4

Supply-pump pressure:

1/min: 900

Setting value bar: 4.2...4.8

Full-load del. w/out charge press.:

1/min: 900 Speed

Del.quantity cm3/ 1000H.: 67.0...68.0

cm3/: 4.0 Dispersion

1000H.: (4.5)

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/

1000H.: 8.0...14.0

cm3/: 5.5 Dispersion

1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1190

Del.quantity cm3/

1000H: 47.0...53.0

Start:

Speed 1/min: 100 Del.quantity

cm3/1000H.: 70.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 750

TD travel mm: 1.8...2.6 mm: (0.5...1.9)

1/min: 900 2nd speed

mm: 2.0...2.4 TD travel

mm: (1.5...2.9) 1/min: 1150

3rd speed

mm: 3.2...4.0 TD travel

mm: (2.9...4.3)

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 2.5...3.1 pressure

1/min: 900 2nd speed

Supply-pump

bar: 4.2...4.8 pressure

1/min: 1150 3rd speed

C05

Automatic starting fuel delivery: Supply-pump bar: 5.2...5.8 pressure 1st speed 1/min: 130 Overflow quantity at overflow valve: Del.quantity cm3/: -1000H: 80.0 ind. 1st speed 1/min: 500 Oveflow : 41...83 2nd speed 1/min: 240 Del.quantity cm3/: - max. 1000H: 80.0 quantity cm3/10s: (26...98) 1/min: 1150 2nd speed : 55...138 Overflow quantity cm3/10s: (40...153) Shutoff electromagnet: Cut-in Delivery-quant. and breakaway char .: min. voltage : 10.0 : 12.0 1/min: 1300 Rated voltage 1st speed Del.quantity cm3/: 0.0...3.0 1000H.: -Mounting and assembly dimensions: 1/min: 1220 2nd speed Del.quantity cm3/: 15.0...55.0 1000H.: -Designation mm KF : 5.0...5.4 3rd speed 1/min: 1190 mm Del.quantity cm3/: 47.0...53.0 : 1.1...1.3 MS mm 1000H.: (44.0...56.0) SVS max. mm : 4.0 1/min: 1150 4th speed Del.quantity cm3/: 63.5...66.5 Remarks: 1000H.: (62.0...68.0) 1/min: 900 5th speed Heavy-duty fuel-injection pump for Del.quantity cm3/: 67.0...68.0 1000H.: (64.5...70.5) 6th speed 1/min: 750 DI-engines: only test using timingdevice-travel measuring device with metal jacket Del.quantity cm3/: 69.5...73.5 1000H.: (67.5...75.5) 1/min: 500 7th speed Del.quantity cm3/: 68.0...76.0 1000H.: (66.0...78.0) Zero delivery (stop): Mech. shutoff: 1/min: 1150 Speed Del.quantity cm3/: 0..3 1000H .: -Electr. shutoff: 1/min: 375 Speed volt: -ELAB Del.quantity cm3/: 0.0...3.0 max. 1000H.: -Idle delivery: 1/min: 375 1st speed Del.quantity cm3/: 8.0...14.0 1000H.: (6.0...16.0) 1/min: 500 2nd speed Del.quantity cm3/: 0.0...4.0 1000H.: -

Note inst. in remarks column

Test sheet : CUM 3.9 P26 : 21.06.90 Edition

replaces

Calibrating oil : ISO 4113

Injection pump : VE 4/12F1000 R378-1

: 0 460 424 059 Type number

Customer-specific information

Customer : CUM

Engine : 4BTA 3.9 IND.

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

assembly : 1 688 901 027

Openina

bar: 250...253 pressure

Perforated plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm : 0.3

(from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.8

mm: +-0.02(0.06)

Outlet

Injection-pump setting values Test specifications in parentheses

Timing device travel:

1/min: 900 Speed

Setting value mm: 2.4...2.8

Supply-pump pressure:

1/min: 900 Speed Setting value bar: 4.0...4.6

Full-load del. w/out charge press.:

1/min: 900 Speed

Del.quantity cm3/

1000H.: 67.5...68.5

Dispersion cm3/: 4.0

1000H.: (4.5)

Low-idle speed regulation:

Speed 1/min: 350

Del.quantity cm3/ 1000H:: 3.0...9.0 Dispersion cm3/: 5.5

1000H.: (7.0)

Full-load speed regulation:

1/min: 1060 Speed

Del.quantity cm3/ 1000H: 50.5...56.5

Start:

1/min: 100 Speed Del.quantity

cm3/1000H.: 70.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 750 1st speed

TD travel mm: 1.3...2.1

mm: (1.0...2.4)

1/min: 900 2rd speed

TD travel mm: 2.4...2.8

mm: (1.9...3.3)

1/min: 1000 3rd speed

TD travel

mm: 2.7...3.5 mm: (2.4...3.8)

Supply-pump pressure characteristic:

1st speed 1/min: 500

Supply-pump

bar: 2.2...2.8 pressure

Timing valve volt: 900

Supply-pump

bar: 4.0...4.6 pressure

1/min: 1000 3rd speed

Automatic starting fuel delivery: Supply-pump bar: 4.4...5.0 pressure 1st speed 1/min: 130 Overflow quantity at overflow valve: Del.quantity cm3/: -1000H: 90.0 ind. 1st speed 1/min: 500 : 41...83 Oveflow 2nd speed 1/min: 240 cm3/10s: (26...98) Del.quantity cm3/: -max. 1000H : 90.0 quantity 1/min: 1000 2nd speed max. : 55...138 Overflow quantity cm3/10s: (40...153) Shutoff electromagnet: Delivery-quant. and breakaway char.: Cut-in min. voltage : 10.0 1/min: 1200 Rated voltage : 12.0 1st speed Del.quantity cm3/: 0.0...3.0 1000H .: -Mounting and assembly dimensions: 1/min: 1100 2nd speed Del.quantity cm3/: 15.0...55.0 1000H.: -Designation mn 3rd speed 1/min: 1060 Del.quantity cm3/: 50.5...56.5 1000H.: (47.5...59.5) KF : 5.0...5.4 mm mm : 1.1...1.5 MS SVS max. mm : 3.01/min: 1000 4th speed Del.quantity cm3/: 65.5...68.5 Remarks: 1000H.: (64.0...70.0) 1/min: 900 Heavy-duty fuel-injection pump for DI-engines: only test using timing-5th speed Del.quantity cm3/: 67.5...68.5 device-travel measuring device with 1000H.: (65.0...71.0) metal jacket 1/min: 750 6th speed cm3/: 70.0...74.0 Del.quantity 1000H.: (68.0...76.0) 7th speed 1/min: 500 Del.quantity cm3/: 70.0...78.0 1000H.: (68.0...80.0) Zero delivery (stop): Mech. shutoff: 1/min: 1000 Speed Del.quantity\_cm3/: 0..3 1000H.: -Electr. shutoff: 1/min: 350 Speed ELAB volt: -Del.quantity cm3/: 0.0...3.0 1000H.: max. Idle delivery: Mfg. date: until : 350 Del.quantity cm3/: 3.0...9.0 1000H.: (1.0...11.0) 1/min: 500 2nd speed Del.quantity cm3/: 0.0...4.0 1000H.: -

Note inst. in remarks column

: CUM 3.9 P28 Test sheet : 21.06.90 Edition

replaces

Calibrating oil : ISO 4113

: VE 4/12F1250 RV378-2 Injection pump

Type number : 0 460 424 G60 Customer Part-No. : 3 917 030

Customer-specific information

Customer : CUM

: 4BT 3.9 IND. Engine

k: 63 Power Speed 1/mi: 2500

TEST BENCH REQUIREMENTS

Calibrating oil return temp.

with thermometer : 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Openina

bar: 250...253 pressure

Perforated plate

mm: 0.5 diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Lenath

Start of delivery

Prestroke mm : 0.3

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.8

mm: +-0.02(0.06)

Outlet

Injection-pump setting values Test specifications in parentheses Timina-device travel:

Speed 1/min: 900 Setting value mm: 2.0...2.4

Supply-pump pressure:

1/min: 900 Speed

Setting value bar: 4.6...5.2

Full-load del. w/out charge press.:

1/min: 1100 Speed

Del.quantity cm3/

1000H.: 68.5...69.5

cm3/: 4.0Dispersion 1000H.: (4.5)

Low-idle speed regulation:

Speed 1/min: 335

Del.quantity cm3/ 1000H.: 8.0...14.0

cm3/: 5.5 Dispersion 1000H .: (7.0)

Full-load speed regulation:

Speed 1/min: 1290

Del.quantity cm3/

1000H: 58.0...64.0

Start:

Speed 1/min: 100 Del.quantity

cm3/1000H.: 70.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 750 1st speed

TD travel

mm: 0.8...1.6 mm: (0.5...1.9) 1/min: 900

2nd speed TD travel mm: 2.0...2.4

mm: (1.5...2.9)

1/min: 1100 3rd speed

TD travel mm: 2.9...3.7 mm: (2.6...4.0)

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 2.7...3.3 1/min: 750 pressure

2nd speed

Del.guantity cm3/: 8.0...14.0 Supply-pump bar: 3.9...4.5 1000H.: (6.D...16.0) pressure 1/min: 900 1/min: 500 3rd speed 2nd speed Del.quantity cm3/: 0.0...4.0 1000H.: -Supply-pump bar: 4.6...5.2 pressure 1/min: 1100 4th speed Automatic starting fuel delivery: Supply-pump bar: 5.4...6.0 pressure 1st speed 1/min: 130 Overflow quantity at overflow valve: Del.quantity cm3/: -1000H: 75.0 ind. 1/min: 500 1st speed Oveflow : 41...83 2nd speed 1/min: 300 quantity cm3/10s: (26...98) Del.quantity cm3/: -1000H: 80.0 1/min: 1250 2nd speed max. : 55...138 Overflow quantity cm3/10s: (40...153) Shutoff electromagnet: Delivery-quant. and breakaway char.: Cut-in min. voltage : 10.0 1st speed 1/min: 1450 Rated voltage : 12.0 Deliquantity cm3/: 0.0...3.0 1000H.: -Mounting and assembly dimensions: 1/min: 1360 2nd speed Del.quantity cm3/: 15.0...55.0 Designation 1000H.: -K mn 3rd speed 1/min: 1290 Del.quantity cm3/: 58.0...64.0 1000H.: (55.0...67.0) KF : 5.0...5.4 mm : 0.8...1.2 MS mn SVS max. : 4.8 1/min: 1250 4th speed Del.quantity cm3/: 66.5...69.5 Remarks: 1000H.: (65.0...71.0) 1/min: 1100 Heavy-duty fuel-injection pump for 5th speed cm3/: 68.5...69.5 Del.quantity DI-engines: only test using timing-1000H.: (66.0...72.0) device-travel measuring device with 1/min: 750 metal jacket 6th speed cm3/: 73.0...77.0 Del.quantity 1000H.: (71.0...79.0) 7th speed 1/min: 500
Del.quantity cm3/: 74.0...82.0 1000H.: (72.0...84.0) Zero delivery (stop): Mech. shutoff: 1/min: 1250 Speed Del.quantity cm3/: 0..3 1000H .: -Electr. shutoff: 1/min: 335 Speed ELAB volt: -Del.quantity cm3/: 0.0...3.0 1000H.: -Idle delivery: 1st speed 1/min: 335

Note inst. in remarks column

: CUM 3.9 P27 Test sheet Edition : 21.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 4/12F1250 RV378-2

Type number : 0 460 424 060 Customer Part-No. : 3 917 511

Customer-specific information

Customer : CUM

: 48T 3.9 IND. Engine

k: 74 Power 1/mi: 2500 Speed

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated-plate

mm: 0.5 diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

mm: 0.3 Prestroke

(from BDC): +0.02(0.04)

Start of delivery block mm: 1.8

Piston stroke

mm: +0.02(0.06)

Outlet.

Injection pump setting values Test specifications in parentheses Timing-device travel:

1/min: 900 Setting value mm: 2.0...2.4

Supply-pump pressure:

1/min: 900 Speed

Setting value bar: 4.6...5.2

Full-load del. w/out charge press.:

Speed 1/min: 1100

Del.quantity cm3/

1000H.: 68.5...69.5

cm3/: 4.0Dispersion

1000H.: (4.5)

Low-idle speed regulation:

Speed 1/min: 335

Del.quantity cm3/

1000H.: 8.0...14.0

cm3/: 5.5 Dispersion 1000H.: (7.0)

Full-load speed regulation:

1/min: 1290 Speed

Del.quantity cm3/ 1000H: 58.0...64.0

Start:

1/min: 100 Speed

Del.quantity cm3/1000H.: 70.0 mind `

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 750 1st speed

TD travel mm: 0.8...1.6

mm: (0.5...1.9)

1/min: 900 2nd speed

mm: 2.0...2.4 TD travel

mm: (1.5...2.9)

1/min: 1100 3rd speed

mm: 2.9...3.7 TD travel

mm: (2.6...4.0)

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: <u>2</u>.7...3.3 pressure

1/min: 750 2nd speed

Del.quantity cm3/: 8.0...14.0 1000H.: (6.0...16.0) Supply-pump bar: 3.9...4.5 pressure 1/min: 900 1/min: 500 3rd speed 2nd speed Del.quantity cm3/: 0.0...4.0 1000H.: -Supply-pump bar: 4.6...5.2 pressure 1/min: 1100 4th speed Automatic starting fuel delivery: Supply-pump bar: 5.4...6.0 pressure 1st speed 1/min: 130 Overflow quantity at overflow valve: Del.quantity cm3/: -1000H: 75.0 ind. 1st speed 1/min: 500 : 41...83 1/min: 300 Oveflow 2nd speed Del.quantity cm3/: -max. 1000H: 80.0 cm3/10s: (26...98) quantity 2nd speed 1/min: 1250 : 55...138 Overflow quantity cm3/10s: (40...153) Shutoff electromagnet: Cut-in Delivery quant. and breakaway char .: min. voltage : 10.0 : 12.0 1st speed 1/min: 1450 Rated voltage Del.quantity cm3/: 0.0...3.0 1000H.: -Mounting and assembly dimensions: 2nd speed 1/min: 1360 Del.quantity cm3/: 15.0...55.0 Designation 1000H.: -K KF mm : 5.0...5.4 3rd speed 1/min: 1290 mm MS : 0.8...1.2 mm SVS max. : 4.8 mm 4th speed 1/min: 1250 Del.quantity cm3/: 00.3....71.0) Remarks: 1/min: 1100 Heavy-duty fuel-injection pump for 5th speed DI-engines: only test using timingdevice-travel measuring device with 6th speed 1/min: 750
Del.quantity cm3/: 73.0...77.0
1000H.: (71.0...79.0) metal jacket 7th speed 1/min: 500
Del.quantity cm3/: 74.0...82.0
1000H.: (72.0...84.0) Zero delivery (stop): Mech. shutoff: 1/min: 1250 Speed Del.quantity cm3/: 0..3 1000H.: -Electr. shutoff: 1/min: 335 Speed ELAB volt: -Del.quantity cm3/: 0.0...3.0 1000H .: max. Idle delivery: 1st speed 1/min: 335

Note inst. in remarks column

: CUM 3.9 P29 Test sheet Edition : 22.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 4/12F1050 R378-3

Type number : 0 460 424 061 Customer Part-No. : 3 916 927

Customer-specific information

Customer : CUM

: 4BT 390 IND. Engine

TEST BENCH REQUIREMENTS

Calibrating-oil

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening .

bar: 250...253 pressure

Perforated-plate

mm: 0.5 diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

mm:0.3Prestroke

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.8

mm: +-0.02(0.06)

Outlet : A

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 900 Speed

Setting value mm: 2.3...2.7

Supply-pump pressure:

1/min: 900 Setting value bar: 4.1...4.7

Full-load del. w/out charge press.:

1/min: 900 Speed

Del.quantity cm3/ 1000H.: 69.0...70.0

cm3/: 4.0Dispersion

1000H.: (4.5)

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/ 1000H.: 10.0...12.0 Dispersion cm3/: 5.5 1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1110

Del.quantity cm3/

1000H: 49.0...55.0

Start:

Speed 1/min: 100

Del.quantity cm3/1000H.: 70.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 750

TD travel

mm: 1.3...2.1 mm: (1.0...2.4)

1/min: 900 2nd speed

TD travel mm: 2.3...2.7

mm: (1.8...3.2)

3rd speed

1/min: 1050 mm: 2.8...3.6 mm: (2.5...3.9) TD travel

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 2.3...2.9 pressure

1/min: 900 2nd speed

Supply-pump

bar: 4.1...4.7 pressure

3rd speed 1/min: 1050

Automatic starting fuel delivery: Supply-pump bar: 4.8...5.4 pressure 1st speed 1/min: 130 Overflow quantity at overflow valve: Del.quantity cm3/: -1000H: 80.0 ind. 1st speed 1/min: 500 : 41...83 1/min: 240 Oveflow 2nd speed cm3/10s: (26...98) quantity Del.quantity cm3/: -1000H: 80.0 2nd speed 1/min: 1050 max. : 55...138 Overflow quantity cm3/10s: (40...153) Shutoff electromagnet: Delivery-quant. and breakaway char.: Cut-in min. voltage : 10.0 1st specu Del.quantity cms/: 0 1000H.: -1/min: 1200 Rated voltage : 12.0 1st speed cm3/: 0.0...3.0 Mounting and assembly dimensions: 1/min: 1140 cm3/: 15.0...55.0 Zna specific cms/...

1000H.: -2nd speed Designation K mn 1/min: 1110 KF : 5.0...5.4 3rd speed mm Del.quantity cm3/: 49.0...58.0) : 1.1...1.5 MS mm SVS max. : 3.8 mm 1/min: 1050 4th speed cm3/: 66.0...69.0 Del.quantity Remarks: 1000H.: (64.5...70.5) 1/min: 900 5th speed Heavy-duty fuel-injection pump for Del.quantity cm3/: 69.0....2.5) DI-engines: only test using timingdevice-travel measuring device with 1/min: 750 cm3/: 72.0...76.0 metal jacket 6th speed Del.quantity cm5/: 72.0....78.0) 1/min: 500 7th speed Del.quantity cm3/: 72.0...80.0 1000H.: (70.0...82.0) Zero delivery (stop): Mech. shutoff: 1/min: 1050 Speed Del.quantity cm3/: 0..3 1000H.: -Electr. shutoff: Speed 1/min: 375 ELAB volt: -Del.guantity cm3/: 0.0...3.0 1000H.: max. Idle delivery: 1st speed 1/min: 375 Del.quantity cm3/: 10...2.0 1000H.: (6.0...16.0) 2nd speed 1/min: 500 Del.quantity cm3/: 0.0...4.0 1000H.: -

Note inst. in remarks column

: CUM 3.9 P23 Test sheet Edition : 21.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 4/12F1150 R374-1

Type number : 0 460 424 063 Customer Part-No. : 3 917 021

Customer-specific information

Customer : CUM

: 4BTA 3.9 IND. Engine

k: 82 Power Speed 1/mi: 2300

TEST BENCH REQUIREMENTS

Calibrating-oil return temp. °C

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

assembly : 1 688 901 027

Opening |

bar: 250...253 pressure

Perforated plate

mm: 0.5 diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm: 0.3

(from BDC): +-0.02(0.04)

Start of delivery block mm: 1.55 Piston stroke

mm: +-0.02(0.06)

Outlet : A

Injection-pump setting values Test specifications in parentheses Timing-device travel:

1/min: 850 Charge press. hPa: 1000 Setting value mm: 4.0...4.4

Supply-pump pressure:

Speed 1/min: 850 Charge press. hPa: 1000 Setting value bar: 5.6...6.2

Full-load del. with charge press.:

Speed 1/min: 850 Charge press. hPa: 1000

Del.quantity cm3/ 1000H.: 85.5...86.5

cm3/ : 4.0 1000H : (4.5) Dispersion

Full-load del. w/out charge press.:

 $1/\min : 500$ Speed

Del.quantity cm3/

1000H.: 79.5...80.5

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/ 1000H.: 8.0...14.0

cm3/: 5.5 Dispersion

1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1220 Charge press. hPa: 1000 Del.quantity cm3/ 1000H: 62.5...68.5

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 60.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 500 Charge press. hPa: 1000 TD travel

mm: 1.8...2.6 mm: (1.5...2.9)

2nd speed 1/min: 850 Charge press. hPa: 1000

TD travel mm: 4.04.4	+ Charge press. hPa: 1000
mm: (3.54.9)	Del.quantity cm3/: 85.586.5
3rd speed 1/min: 1150	1000H.: (83.089.0) 8th speed 1/min: 700
Charge press. hPa: 1000 TD travel mm: 5.26.0	L Charge press hPa: 350
mm: (4.96.3)	Charge press. hPa: 350 Del.quantity cm3/: 79.580.5
	+ 1000H: (76.084.0)
Supply-pump pressure characteristic:	→ 9th speed 1/min: 500
4	+ Del.quantity cm3/: 63.564.5
1st speed 1/min: 500 Charge press. hPa: 1000	1000H: (60.068.0)
Charge press. hPa: 1000 Supply-pump	Zero delivery (stop):
pressure bar: 4.04.6	+ 2010 decivery (3:0p).
pressure bar: 4.04.6 2nd speed 1/min: 850	<pre>Mech. shutoff:</pre>
Charge press. hPa: 1000	+
Supply-pump	+ Speed 1/min: 1150
pressure bar: 5.66.2	Del.quantity cm3/: 03 1000H.: -
3rd speed 1/min: 1150 Charge press. hPa: 1000	T 1000H.: -
Supply-pump	Electr. shutoff:
pressure bar: 6.97.5	- Ecoott Gradott
	Speed 1/min: 375
Overflow quantity at overflow valve:	+ ELAB volt: -
4.4.5.500	Del.quantity cm3/: 0.03.0
1st speed	max. 1000H.: -
quantity cm3/10s: (2698)	Idle delivery:
2nd speed 1/min: 1150	ide decivery.
Charge press. hPa: 1000	1st speed
Overflow: 55138	+ Del.quantity cm3/: 8.014.0
quantity cm3/10s: (40153)	+ 1000H.: (6.016.0)
	2nd speed 1/min: 450
Delivery-quant. and breakaway char.:	Del.quantity cm3/: 0.04.0 1000H.: -
1st speed 1/min: 700	100011.
Charge-air pressure-setting	Automatic starting fuel delivery:
point hPa: 350	-
Del.quantity cm3/: 79.580.5	1st speed 1/min: 130
1000H.: (76.084.0)	Del.quantity cm3/: -
2nd speed	ind. 1000H: 60.0
Del.quantity cm3/: 0.03.0	2nd speed 1/min: 230
1000H.: -	Del.quantity cm3/: -
3rd speed 1/min: 1260	max. 1000H : 60.0
Charge press. hPa: 1000	
Del.quantity cm3/: 15.055.0	Shutoff electromagnet:
1000H.: - 4th speed	Cut-in
Charge press. hPa: 1000	min. voltage : 10.0
Del.quantity cm3/: 62.568.5	Rated voltage : 12.0
1000H.: (59.571.5)	
5th speed 1/min: 1150 -	Mounting and assembly dimensions:
Charge press. hPa: 1000	
Del.quantity cm3/: 76.079.0	Designation
1000H.: (74.580.5) - 6th speed	+ K mm : - + KF mm : 5.05.4
Charge press. hPa: 1000 -	MS mm : 1.01.4
Del.quantity cm3/: 79.582.5	SVS max. mm : 2.6
1000H.: (77.584.5) -	-
7th speed 1/min: 850 -	Remarks:

Operate control lever after each manifold-pressure compensator pressure change.

\* Correction at adjusting nut (46)

Heavy-duty fuel-injection pump for DI-engines: only test using timing-device-travel measuring device with metal jacket

Note inst. in remarks column

: CUM 3.9 P33 Test sheet : 22.06.90 Edition

replaces

Calibrating oil : ISO 4113

Injection pump : VE 4/12F1400 R389-1

: 0 460 424 066 Type number

Customer-specific information

Customer : CUM

: 4BT-390 Engine

k: 77 Power Speed 1/mi: 2800

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer : 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening |

bar: 250...253 pressure

Perforated plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm : 0.3

(from BDC): +-0.02(0.04)

Start of delivery block mm: 1.66 Piston stroke

mm: +-0.02(0.06)

Outlet

Injection pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 1100 Speed Charge press. hPa: 1000 Setting value mm: 1.8...2.2 Setting value

Supply-pump pressure:

1/min: 1100 Speed Charge press. hPa: 1000 Setting value bar: 4.7...5.3

Full-load del. with charge press.:

Speed 1/min: 900 Charge press. hPa: 1000

Del.quantity cm3/ 1000H.: 69.5...70.5

cm3/: 4.0Dispersion

1000H: (4.5)

Full-load del. w/out charge press.:

Speed  $1/\min : 500$ 

Del.quantity cm3/

1000H.: 36.5...37.5

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/

1000H.: 8.0...14.0

Dispersion cm3/: 5.5

1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1500 Charge press. hPa: 1000

Del.quantity cm3/ 1000H: 54.0..60.0

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 40.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 900 1st speed Charge press. hPa: 1000

mm: 0.3...1.1 TD travel

mm: (0.0...1.4) 1/min: 1100 2nd speed

Charge press. hPa: 1000

TD travel mm: 1.82.2	+ Charge press. hPa: 400
mm: (1.32.7)	+ Del.quantity cm3/: 67.068.0
3rd speed	+ 1000H.: (63.571.5)
Charge press. hPa: 1000	+ 8th speed 1/min: 500
TD travel mm: 2.93.7	+ Del.quantity cm3/: 36.537.5
mm: (2.64.0)	1000H: (33.041.0)
Supply-pump pressure characteristic:	Zero delivery (stop):
1st speed 1/min: 500	# Mech. shutoff:
Charge press. hPa: 1000	-
Supply-pump	+ Speed 1/min: 1400
pressure bar: 2.12.7	
2nd speed 1/min: 1100	Del.quantity cm3/: 03
Charge press. hPa: 1000	+
Supply-pump	+ Electr. shutoff:
pressure bar: 4.75.3	+
3rd speed 1/min: 1400	+ Speed 1/min: 375
Charge press. hPa: 1000	+ ELAB volt: -
Supply-pump	Del.quantity cm3/: 0.03.0
pressure bar: 5.96.5	max. 1000H.: -
Overflow quantity at overflow valve:	Idle delivery:
1st speed 1/min: 500	1st speed 1/min: 375
Oveflow : 4183	Del.quantity cm3/: 8.014.0
quantity cm3/10s: (2698)	1000H.: (6.016.0)
2nd speed 1/min: 1400	2nd speed 1/min: 600
Charge press. hPa: 1000	Del.quantity cm3/: 0.04.0
Overflow : 55138	1000H.: -
quantity cm3/10s: (40153)	I
qualities (10) 103. (40199)	Automatic starting fuel delivery:
Delivery quant. and breakaway char.:	+
	1 1st speed 1/min: 150
1st speed 1/min: 700	+ Del.quantity cm3/: -
Charge-air pressure-setting	+ ind. 1000H: 40.0
point hPa: 400	+
Del.quantity cm3/: 67.068.0	+ 2nd speed 1/min: 380
1000H.: (63.571.5)	+ Del.quantity cm3/: -
2nd speed 1/min: 1650	# max. 1000H: 40.0
Charge press. hPa: 1000	+
Del.quantity cm3/: 0.03.0	+ Shutoff electromagnet:
1000H.: -	+
3rd speed 1/min: 1590	+ Cut-in
Charge press. hPa: 1000	† min. voltage : 10.0
Del.quantity cm3/: 15.055.0 1000H.: -	Rated voltage : 12.0
4th speed 1/min: 1500	Mounting and assembly dimensions:
Charge press. hPa: 1000	T mounting and assembly difficultions.
Deliquentity cm3/: 54.060.0	Designation
1000H.: (51.063.0)	1 4. =
5th speed 1/min: 1400	+ K mm : - + KF mm : 5.05.4
Charge press. hPa: 1000 Del.quantity cm3/: 64.567.5	+ MS
1000H.: (63.069.0)	T SVS IIMA. IIMI . C. /
6th speed 1/min: 900	T Remarks:
Charge press. hPa: 1000	Operate control Lever after each
Del.quantity cm3/: 69.570.5	+ manifold pressure compensator pressure
1000H.: (67.073.0)	+ change.
7th speed 1/min: 700	1 ciminger

\* Correction at adjusting nut (46)

Note inst. in remarks column

: CUM 3.9 P32 Test sheet : 22,06,90 Edition

replaces

: ISO 4113 Calibrating oil

: VE 4/12F1400 R389-1 Injection pump

: 0 460 424 066 Type number Customer Part-No.: 3 917 018

Customer-specific information

Customer : CUM

Engine : 4BT-390

Power k: 77 1/mi: 2800 Speed

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated-plate

mm : 0.5diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 x Length mm: 840.0

Start of delivery

Prestroke mm: 0.3

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.66

mm: +-0.02(0.06)

**Outlet** : A

Injection-pump setting values Test specifications in parentheses Timing-device travel:

1/min: 1100 Speed Charge press. hPa: 1000 Setting value mm: 1.8...2.2

Supply-pump pressure:

1/min: 1100 Speed Charge press. hPa: 1000 Setting value bar: 4.7...5.3

Full-load del. with charge press.:

Speed 1/min: 900 Charge press. hPa: 1000 Del.quantity cm3/ 1000H.: 69.5...70.5

cm3/: 4.0Dispersion 1000H: (4.5)

Full-load del. w/out charge press.:

Speed  $1/\min : 500$ 

Del.quantity cm3/

1000H.: 36.5...37.5

Low-idle speed regulation:

Speed 1/min: 375

Del.quantity cm3/

1000H.: 8.0...14.0

cm3/: 5.5 1000H.: (7.0) Dispersion

Full-load speed regulation:

Speed 1/min: 1500 Charge press. hPa: 1000 Del.quantity cm3/ 1000H: 54.0..60.0

Start:

Speed 1/min: 100 Del.quantity cm3/1000H.: 40.0 mind

Inspection pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 900 Charge press. hPa: 1000

mm: 0.3...1.1 TD travel

mm: (0.0...1.4) 1/min: 1100

2nd speed Charge press. hPa: 1000

TD travel mm: 1.82.2	Charge press. hPa: 400 Del.quantity cm3/: 67.068.0
3rd speed 1/min: 1400 -	1000H.: (63.571.5)
Charge press. hPa: 1000	8th speed 1/min: 500
TD travel mm: 2.93.7 -	Del.guantity cm3/: 36.537.5
mm: (2.64.0)	8th speed 1/min: 500 Del.quantity cm3/: 36.537.5 1000H: (33.041.0)
Supply-pump pressure characteristic:	Zero delivery (stop):
1st speed 1/min: 500 -	Mech. shutoff:
Charge press. hPa: 1000	4/100
Supply-pump -	Speed 1/min: 1400
pressure bar: 2.12.7 - 2nd speed 1/min: 1100 -	Del.quantity cm3/: 03 1000H.: -
Change proces here 1000	100011.1
Charge press. hPa: 1000	F Electr. shutoff:
Supply-pump pressure bar: 4.75.3	r Etectr. Silutorr.
3rd speed 1/min: 1400	Speed 1/min: 375
Charge press. hPa: 1000	ELAB Volt: -
Supply-pump	Del.quantity cm3/: 0.03.0
pressure bar: 5.96.5	- max. 1000H.: -
Overflow quantity at overflow valve:	- Idle delivery:
1st speed 1/min: 500	1st speed 1/min: 375
Oveflow : 4183	- Del.quantity cm3/: 8.014.0
quantity cm3/10s: (2698)	1000H.: (6.016.0)
2nd speed 1/min: 1400	2nd speed 1/min: 600
Charge press. hPa: 1000	- Del.quantity cm3/: 0.04.0
Overflow : 55138	1000H.: -
quantity cm3/10s: (40153)	-
quarterly sharrost traverses	Automatic starting fuel delivery:
Delivery-quant. and breakaway char.:	- Haddinatio Charlettig Fact accessory
	1st speed 1/min: 150
1st speed 1/min: 700	- Del.quantity cm3/: -
Charge-air pressure-setting	- ind. 1000H: 40.0
point hPa: 400	
Del.quantity cm3/: 67.068.0	- 2nd speed 1/min: 380
1000H.: (63.571.5)	- Del.quantity cm3/: - - max. 1000H : 40.0
2nd speed	- max. 1000H: 40.0
Charge press. hPa: 1000	
Del.quantity cm3/: 0.03.0	- Shutoff electromagnet:
3rd speed 1/min: 1590	- Cut-in
Charge press. hPa: 1000	min. voltage : 10.0
Del.quantity cm3/: 15.055.0	- Rated voltage : 12.0
4th speed 1/min: 1500	- Mounting and assembly dimensions:
Charge press. hPa: 1000	-
Del.quantity cm3/: 54.060.0	- Designation
1000H.: (51.063.0)	- K mm : -
5th speed 1/min: 1400	- KF mm : 5.05.4
Charge press. hPa: 1000	- MS mm : 0.81.2
Del.quantity cm3/: 64.567.5	- SVS max. mm : 2.7
1000H.: (63.069.0)	-
6th speed 1/min: 900	- Remarks:
Charge press. hPa: 1000 +	•
Del.quantity cm3/: 69.570.5	- Operate control lever after each
1000H.: (67.073.0)	<ul> <li>manifold-pressure compensator pressure</li> </ul>
7th speed 1/min: 700	- change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

: CUM 3.9 N32 Test sheet Edition : 10.07.90 replaces : 17.01.90 Calibrating oil : ISO 4113

: VE 4/12F1400 R390 Injection pump : 0 460 424 067 Type number

Customer-specific information

Customer : CDC

Engine : 4 BTA 3.9

k: 92 Power 1/mi: 2800 Speed

TEST BENCH REQUIREMENTS

Calibrating-oil

with thermometer: 40...48 : 42...50 electronically

Inlet press., bar: 0.35

Calibrating nozzle-holder

assembly : 1 688 901 027

Opening 1

bar: 250...253 pressure

Perforated-plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840 x Lenath

Start of delivery

mm:0.3Prestroke

(from BDC): +-0.02(0.04)

Start of delivery block mm: 1.95 Piston stroke

mm: +-0.02(0.06)

Outlet : A

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 1100 Speed Charge press. hPa: 1000 mm: 2.2...2.6 Setting value

Supply-pump pressure:

1/min: 1100 Speed Charge press. hPa: 1000 Setting value bar: 5.7...6.3

Full-load del. with charge press.:

1/min: 750 Speed Charge press. hPa: 1000

Del.quantity cm3/ 1000H.: 82.0...83.0

cm3/: 4.0 1000H: (4.5) Dispersion

Full-load del. w/out charge press.:

Speed  $1/\min : 500$ 

Del.quantity cm3/ 1000H.: 55.5...56.5

Low-idle speed regulation:

1/min: 400 Speed Charge press. hPa: -Del.quantity cm3/

1000H.: 4.0...6.0

cm3/: 5.5Dispersion 1000H.: (7.0)

Full-load speed regulation:

1/min: 1500 Speed Charge press. hPa: 1000 Del.quantity cm3/ 1000H: 48.5...54.5

Start:

1/min: 100 Speed Charge press. hPa: cm3/1000H.: 70.0 mind

Inspection pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 850 Charge press. hPa: 1000

mm: 0.7...1.5 mm: (0.4...1.8) TD travel

1/min: 1100 2nd speed Charge press. hPa: 1000

TD travel mm:	2.22.6	+	6th speed 1/min: 1100
3rd speed 1/min:	(1.73.1)	+	Charge press. hPa: 1000 Del.quantity cm3/: 77.080.0
3rd speed 1/min:	1250	+	Del.quantity cm3/: 77.080.0
0.10. 30 p. 000 ut		+	1000H.: (75.032.0)
TD travel mm:	2.83.6	+	7th speed 1/min: 750
mm:	(2.53.9)	+	Charge press. hPa: 1000
		+	Del.quantity_cm3/: 82.083.0
Supply-pump pressur	e characteristic:	†	1000H.: (79.585.5)
A 1 1 A 1 *	500	+	8th speed 1/min: 500
1st speed 1/min:	500 4000	†	Charge press. hPa: 1000
Charge press. hPa:	1000	†	Del.quantity cm3/: 94.0104.0
Supply-pump	7 2 7 0	†	1000H: -
pressure bar:	3.23.0 ocn	Ť	9th speed 1/min: 500
2nd speed 1/min:	000 1000	Ť	Charge press. hPa: -
Charge press. hPa:	1000	T	Del.quantity cm3/: 55.556.5 1000H: (52.060.0)
Supply-pump bar:	17 53	Ι	τουση. (32.0ου.υ)
3rd speed 1/min:	1100	Ι	Zero delivery (stop):
Charge press. hPa:		I	zero decreery (scop).
Supply-pump	1000	1	Mech. shutoff:
pressure bar:	5.76.3	1	THOUGHT SHOULD THE
4th speed 1/min:	1250	Ţ	Speed 1/min: 1400
Charge press. hPa:	1000	1	Del.quantity cm3/: 03
Supply-pump		+	1000H.: -
pressure bar:	6.36.9	+	
1		+	Electr. shutoff:
Overflow quantity a	t overflow valve:	+	
•		+	Speed 1/min: 400
1st speed 1/min:	500	+	ELAB volt: -
Charge press. hPa:	-	+	Del.quantity_cm3/: 0.03.0
Oveflow:	4183	+	max. 1000H.: -
quantity cm3/10s:	(2698)	+	
2nd speed 1/min:	1400	+	Idle delivery:
Charge press. hPa:	1000	+	
Overflow :		+	1st speed 1/min: 400
quantity cm3/10s:	(40153)	+	Del.quantity cm3/: 4.06.0 1000H.: (0.010.0)
~		+	1000H.: (0.010.0)
Delivery-quant. and	breakaway char.:	†	2nd speed 1/min: 450
4.1 1 4/	700	+	Del.quantity cm3/: 0.04.0 1000H.: -
1st speed 1/min:	700	†	1000H.: -
Charge-air pressure	-setting	<b>†</b>	Andreas de la compansa de la compans
point hPa:	33U 4/, 5 45 5	Ť	Automatic starting fuel delivery:
Del.quantity cm3/:	(61.069.0)	I	1st speed 1/min: 230
2nd speed 1/min:		Ι	Charge press. hPa: -
Charge press. hPa:			ind. 1000H: 80.0
Del.quantity cm3/:	000	1	1100011. 00.0
1000H.:		1	2nd speed 1/min: 400
3rd speed 1/min:		1	Charge press. hPa: -
Charge press. hPa:		1	max. 1000H: 80.0
Del.quantity cm3/:	15.045.0	1	,, <u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>
1000H.:	-	+	Shutoff electromagnet:
4th speed 1/min:		+	
Charge press. hPa:	1000	+	Cut-in
Del.quantity cm3/:	48.554.5	+	min. voltage : 10.0
1000н.:	(45.557.5)	+	Rated voltage : 12.0
5th speed 1/min:	1400	+	<u>-</u>
Charge press. hPa:	1000	+	Mounting and assembly dimensions:
Del.quantity cm3/:	74 0 77.0	.1.	
	(69.575.5)	T	Designation

K mm : K-OT mm : 1.0...1.4 svs max. mm : 1.2

## Remarks:

Overflow restriction 0.75 mm - Part No. ..343,...344

\* Correction at adjusting nut (46)

Note inst. in remarks column

: CUM 3.9 P30 Test sheet Edition : 22.06.90

replaces

: ISO 4113 Calibrating oil

: VE 4/12F1050 R378-6 Injection pump

Type number : 0 460 424 071

Customer—specific information

Customer : CUM

Engine : 4BT 390 IND.

TEST BENCH REQUIREMENTS

Calibrating oil return temp.

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening |

bar: 250...253 pressure

Perforated-plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm : 0.3

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.8

mm: +-0.02(0.06)

Outlet: : A

Injection pump setting values Test specifications in parentheses

Timing device travel:

1/min: 900

Setting value mm: 2.3...2.7

Supply-pump pressure:

Speed 1/min: 900

Setting value bar: 4.1...4.7

Full-load del. w/out charge press.:

1/min : 900 Speed

Del.quantity cm3/

1000H.: 65.5...66.5

Dispersion cm3/: 4.0

1000H.: (4.5)

Low-idle speed regulation:

1/min: 370 Speed

Del.quantity cm3/

1000H.: 15.0...17.0

cm3/: 5.5Dispersion

1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1085

Del.quantity cm3/ 1000H: 52.0...58.0

Start:

Speed 1/min: 100

Del.quantity cm3/1000H.: 65.0 mind '

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 750

TD travel mm: 1.3...2.1 mm: (1.0...2.4)

1/min: 900 2nd speed

mm: 2.3...2.7 TD travel

mm: (1.8...3.2)

3rd speed 1/min: 1050

TD travel mm: 2.8...3.6

mm: (2.5...3.9)

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 2.5...3.1 pressure

1/min: 900 2nd speed

Supply-pump

bar: 4.1...4.7 pressure

1/min: 1050 3rd speed

Supply-pump bar: 4.8...5.4 pressure Overflow quantity at overflow valve: 1/min: 500 1st speed Oveflow : 41...83 cm3/10s: (26...98) quantity 1/min: 1050 2nd speed : 55...138 Overflow quantity cm3/10s: (40...153) Delivery-quant. and breakaway char.: 1st speed 1/min: 1190 Del.quantity cm3/: 0.0...3.0 1000H.: -1/min: 1120 2nd speed Del.quantity cm3/: 15.0...55.0 1000H.: -1/min: 1085 cm3/: 52.0...58.0 3rd speed Del.quantity 1000H.: (49.0...61.0) 1/min: 1050 4th speed cm3/: 62.5...65.5 Del.quantity 1000H.: (61.0...67.0) 5th speed 1/min: 900
Del.quantity cm3/: 65.5...66.5
1000H.: (63.0...69.0) 1/min: 750 6th speed 1/min: 500 7th speed Del.quantity cm3/: 66.0...74.0 1000H.: (64.0...76.0) Zero delivery (stop): Mech. shutoff: 1/min: 1050 Speed Del.quantity cm3/: 0..3 1000H.: -Electr. shutoff: 1/min: 370 Speed ELAB volt: -Del.quantity cm3/: 0.0...3.01000H.: ~ max. Idle delivery: 1000H.: (11...21.0) 2nd speed 1/min: 500 Del.quantity cm3/: 0.0...4.0

Automatic starting fuel delivery:

1st speed 1/min: 130 Del.quantity cm3/: -1000H: 70.0 ind. 1/min: 240 2nd speed Del.quantity cm3/: -max. 1000H: 70.0 Shutoff electromagnet: Cut-in min. voltage : 10.0 : 12.0 Rated voltage Mounting and assembly dimensions: Designation mm KF 5.0...5.4 mm : 1.1...1.5 MS mn SVS max. : 3.8 mm : 18.8...20.8 XK mm XL : 10.9...14.3 Remarks: Heavy-duty fuel-injection pump for DI-engines: only test using timingdevice-travel measuring device with metal iacket

Note inst. in remarks column

: CUM 3.9 P31 Test sheet : 22.06.90 Edition

replaces

Calibrating oil : ISO 4113

: VE 4/12F1050 R389 Injection pump Type number : 0 460 426 065

Customer Part-No.: 3 917 517

Customer-specific information

Customer : CUM

: 48T-390 AUTOM. Engine

k: 78 Power 1/mi: 2100 Speed

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Openina

bar: 250...253 pressure

Perforated-plate

diameter mm : 0.5

Test ini. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

mm: 0.2 Prestroke

(from BDC): +-0.02(0.04)

Start of delivery block mm: 1.0 Piston stroke

mm: +-0.02(0.06)

Outlet. : A

Injection-pump setting values Test specifications in parentheses Timing-device travel:

Speed 1/min: 750 Charge press. hPa: 1000 Setting value mm: 3.4...3.8

Supply-pump pressure:

1/min: 750 Speed Charge press. hPa: 1000 Setting value bar: 5.0...5.6

Full-load del. with charge press.:

1/min: 750 Speed Charge press. hPa: 1000 Del.quantity cm3/

1000H.: 89.5...90.5

cm3/: 4.0Dispersion 1000H: (4.5)

Full-load del. w/out charge press.:

 $1/\min : 500$ Speed

Del.quantity cm3/

1000H.: 63.5...64.5

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/ 1000H.: 8.0...14.0

cm3/: 5.5 Dispersion

1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1100 Charge press. hPa: 1000

Del.quantity cm3/ 1000H: 59.0...65.0

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 60.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 500 Charge press. hPa: 1000

TD travel mm: 1.7...2.5 mm: (1.4...2.8)

1/min: 750 2nd speed

Charge press. hPa: 1000

TD travel mm: 3.43.8 mm: (2.94.3)  3rd speed 1/min: 1050 Charge press. hPa: 1000 TD travel mm: 4.75.5	+ Charge press. hPa: 350 - Del.quantity cm3/: 79.580.5 - 1000H.: (76.084.0) - 8th speed 1/min: 500 - Del.quantity cm3/: 63.564.5
mm: (4.45.8)  Supply-pump pressure characteristic:	1000H: (60.068.0)  Zero delivery (stop):
1st speed 1/min: 500	Mech. shutoff:
Charge press. hPa: 1000 Supply-pump pressure bar: 3.94.5 2nd speed 1/min: 750 Charge press. hPa: 1000 Supply-pump pressure bar: 5.05.6	Speed 1/min: 1050 Del.quantity cm3/: 03 1000H.: -  Electr. shutoff:
3rd speed 1/min: 1050 Charge press. hPa: 1000 Supply-pump pressure bar: 6.36.9	Speed 1/min: 375 ELAB volt: - Del.quantity cm3/: 0.03.0 max. 1000H.: -
Overflow quantity at overflow valve:	Idle delivery:
1st speed 1/min: 500 Oveflow : 4183 quantity cm3/10s: (2698) 2nd speed 1/min: 1050 Charge press. hPa: 1000 Overflow : 55138	1st speed 1/min: 375  Del.quantity cm3/: 8.014.0  1000H.: (6.016.0)  2nd speed 1/min: 450  Del.quantity cm3/: 0.04.0  1000H.: -
quantity cm3/10s: (40153)  Delivery-quant. and breakaway char.:	Automatic starting fuel delivery:
1st speed 1/min: 700 Charge-air pressure-setting point hPa: 350	1st speed 1/min: 130 Del.quantity cm3/: - ind. 1000H: 60.0
Del.quantity cm3/: 79.580.5 1000H.: (76.084.0) 2nd speed 1/min: 1180	- 2nd speed 1/min: 230 - Del.quantity cm3/: - - max. 1000H: 60.0
Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0	Shutoff electromagnet:
1000H.: -  3rd speed   1/min: 1120  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -	Cut-in min. voltage : 10.0 Rated voltage : 12.0
4th speed 1/min: 1100	Mounting and assembly dimensions:
Charge press. hPa: 1000 Del.quantity cm3/: 59.065.0 1000H.: (56.068.0) 5th speed 1/min: 1050 Charge press. hPa: 1000 Del.quantity cm3/: 76.579.5 1000H.: (75.081.0)	Designation  K mm : -  KF mm : 5.66.0  MS mm : 0.91.3  SVS max. mm : 2.2
6th speed 1/min: 750 Charge press. hPa: 1000 Del.quantity cm3/: 89.590.5 1000H.: (87.093.0) 7th &peed 1/min: 700	Remarks:  Operate control lever after each manifold pressure compensator pressure change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

: CUM 5.9 W55 Test sheet Edition : 21.06.90

replaces

Calibrating oil : ISO 4113

: VE 6/12F1250 R372 Injection pump

Type number : 0 460 426 141 Customer Part-No. : 3 916 948

Customer-specific information

Customer : CUM

Engine : 6BT-5.9 IND.

TEST BENCH REQUIREMENTS

Calibrating-oil

with thermometer: 40...48 : 42...50 electronically

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Openina

pressure bar: 250...253

Perforated plate

diameter mm: 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

mm : 0.3 Prestroke

(from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.5

mm: +0.02(0.06)

; D Outlet

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 750 Speed

Setting value mm: 3.4...3.8

Supply-pump pressure:

1/min: 750 Setting value bar: 3.5...4.1

Full-load del. w/out charge press.:

1/min : 1100 Speed

Del.quantity cm3/

1000H.: 68.5...71.5

Low-idle speed regulation:

1/min: 360 Speed

Del.quantity cm3/

1000H.: 8.0...14.0

cm3/: 5.5 Dispersion

1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1300

Del.quantity cm3/

1000H: 51.0...57.0

Start:

1/min: 100 Speed Del.quantity mind cm3/1000H.: 60.0

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed

1/min: 500 mm: 1.3...2.1 mm: (1.0...2.4) TD travel

1/min: 750 2nd speed

TD travel mm: 3.4...3.8

3rd speed

mm: (2.9...4.3) 1/min: 1100 mm: 5.2...6.0 mm: (4.9...6.3) TD travel

Supply-pump pressure characteristic:

1st speed 1/min: 500

Supply-pump

bar: 2.4...3.0 1/min: 750 pressure

2nd speed

Supply-pump

bar: 3.5...4.1 pressure

3rd speed 1/min: 1100

Supply-pump

bar: 4.8...5.4 pressure

004

Overflow quantity at o	overflow valve:
1st speed 1/min: 50 Oveflow : 41 quantity cm3/10s: (2 2nd speed 1/min: 12 Overflow : 55 quantity cm3/10s: (4	83
Delivery-quant, and br	reakaway char.:
	00 03.0
2nd speed 1/min: 13	890 .015.0
3rd speed 1/min: 13	350 3.055.0
4th speed 1/min: 13 Del.quantity cm3/: 51	500  -057.0  8.060.0>
1000H.: (6	50 5.571.5 57.073.0)
6th speed 1/min: 11 Del.quantity cm3/: 73 1000H.: (7	00 3.074.0 0.576.5)
	.578.5 2.580.5)
8th speed 1/min: 50 Del.quantity cm3/: 64 1000H: (6	0 .072.0 .2.074.0)
Zero delivery (stop):	
Mech. shutoff:	
Speed 1/min: 12 Del.quantity cm3/: 0. 1000H.: -	
Electr. shutoff:	
Speed 1/min: 36 ELAB volt: - Del.quantity cm3/: 0. max. 1000H.: -	
Idle delivery:	
1st speed 1/min: 36 Del.quantity cm3/: 8. 1000H.: (6 2nd speed 1/min: 45 Del.quantity cm3/: 0. 1000H.: -	.016.0) 0

Automatic starting fuel delivery:

1st speed 1/min: 130 Del.quantity cm3/: ind. 1000H: 70.0

2nd speed 1/min: 240 Del.quantity cm3/: - max. 1000H: 70.0

Shutoff electromagnet:

Cut-in

min. voltage : 10.0 Rated voltage : 12.0

Mounting and assembly dimensions:

Designation

K mm : KF mm : 5.0...5.4
MS mm : 0.6...1.0
XK mm : 18.8...20.8
XL mm : 11.1...14.5

Remarks:

Note inst. in remarks column

: CUM 5,9 W5 Test sheet Edition : 20.06.90

reptaces

Calibrating oil : ISO 4113

Injection pump : VE 6/12F1325 R367-1

Type number : 0 460 426 146 Customer Part-No. : 3 916 905

Customer-specific information

Customer : CUM

: 6BT 5.9 IND. Engine

k: 97 1/mi: 2650 Power Speed

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer : 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening |

bar: 0.35 pressure

Perforated-plate

mm : 0.5diameter

Test ini. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm:0.3

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.5

mm: +0.02(0.06)

Outlet : D

Injection pump setting values Test specifications in parentheses Timing-device travel:

1/min: 850 Setting value mm: 3.9...4.3

Supply-pump pressure:

Speed 1/min: 850

Setting value bar: 3.9...4.5

Full-load del. w/out charge press.:

1/min: 1100 Speed

Del.quantity cm3/ 1000H.: 56.0...57.0

cm3/: 4.0 Dispersion

1000H .: (4.5)

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/

1000H.: 8.0...14.0

cm3/: 5.5 Dispersion

1000H.: (7.0)

Full-load speed regulation:

1/min: 1400

Del.quantity cm3/

1000H: 36.0...42.0

Start:

1/min: 100 Speed mind cm3/1000H.: 60.0

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 500 1st speed

TD travel mm: 1.3...2.1 mm: (1.0...2.4)

1/min: 850 2nd speed

mm: 3.9...4.3 mm: (3.4...4.8) TD travel

1/min: 1100 3rd speed

mm: 5.9...6.7 mm: (5.6...7.0) TD travel

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 2.5...3.1 pressure

2nd speed 1/min: 850

Supply-pump bar: 3.9...4.5 pressure 1/min: 1100 3rd speed Automatic starting fuel delivery: Supply-pump bar: 4.9...5.5 pressure Overflow quantity at overflow valve: 1st speed 1/min: 500 : 41...83 Oveflow max. cm3/10s: (26...98) quantity 1/min: 1325 2nd speed Overflow : 55...138 quantity cm3/10s: (40...153) Delivery-quant. and breakaway char .: 1/min: 1520 1st speed cm3/: 0.0...3.0Del.quantity 1000H.: -1/min: 1440 K 2nd speed Del.quantity cms/...
1000H.: cm3/: 15.0...45.0 KF MS 1/min: 1400 cm3/: 36.0...42.0 3rd speed Del.quantity cm3/: 30.0...45.0) 1/min: 1325 4th speed Del.quantity cm3/: 52.5...55.5 1000H.: (51.0...57.0) 5th speed 1/min: 1100 Del.quantity cm3/: 56.0...57.0 metal jacket 1/min: 850 6th speed Del.quantity cm3/: 53.5...57.5 1000H.: (51.5...59.5) 7th speed 1/min: 500
Del.quantity cm3/: 38.5...46.5
1000H.: (36.5...48.5) Zero delivery (stop): Mech. shutoff: 1/min: 1325 Speed Del.quantity cm3/: 0..3 1000H.: -Electr. shutoff: 1/min: 375 Speed volt: -Del.quantity cm3/: 0.0...3.0 1000H.: max. Idle delivery: 1st speed 1/min: 375 Del.quantity cm3/: 8.0...14.0 1000H.: (6.0...16.0) 2nd speed 1/min: 450

Del.quantity cm3/: 9.0...13.0 1000H.: -

1st speed 1/min: 130 ind. 1000H: 65.0

1/min: 250 2nd speed 1000H: 65.0

Shutoff electromagnet:

Cut-in

: 10.0 min. voltage Rated voltage : 12.0

Mounting and assembly dimensions:

Designation

mm : 5.0...5.4 TETT : 1.3...1.7 mm

Note inst. in remarks column

: CUM 5.9 W60 Test sheet Edition : 21.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 6/12F1100 R376

: 3 917 560 Type number

Customer-specific information

Customer : CUM

: 68T-5.9 IND. Engine

k: 104 Power 1/mi: 2200 Speed

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 : 42...50 electronically

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening.

bar: 250...253 pressure

Perforated plate

diameter mm: 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm:0.3

 $(from BDC): \leftarrow 0.02(0.04)$ 

Start of delivery block Piston stroke mm: 1.5

mm: +-0.02(0.06)

: D Outlet

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 750 Speed Setting value mm: 3.1...3.5

Supply-pump pressure:

1/min: 750 Setting value bar: 4.1...4.7

Full-load del. w/out charge press.:

1/min: 750 Speed

Del.quantity cm3/

1000H.: 83.5...84.5

cm3/: 4.0 Dispersion

1000H.: (4.5)

Low-idle speed regulation:

1/min: 360

Del.quantity cm3/

1000H.: 8.0...14.0 cm3/: 5.5

Dispersion

1000H.: (7.0)

Full-load speed regulation:

1/min: 1150 Speed

Del.quantity cm3/

1000H: 56.0...62.0

Start:

Speed 1/min: 100 Del.quantity

cm3/1000H.: 80.0 mind '

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 500

mm: 1.0...1.8 TD travel mm: (0.7...2.1)

1/min: 750 2nd speed

mm: 3.1...3.5 TD travel

mm: (2.6...4.0)

1/min: 1100 3rd speed To travel

mm: 5.6...6.4

mm: (5.3...6.7)

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 3.0...3.6 1/min: 750 pressure

2nd speed

Del.quantity cm3/: 0.0...4.0 1000H.: -Supply-pump bar: 4.1...4.7 pressure 1/min: 1100 3rd speed Automatic starting fuel delivery: Supply-pump bar: 5.7...6.3 pressure 1st speed 1/min: 130 Overflow quantity at overflow valve: Del.quantity cm3/: -1000H: 95.0 ind. 1/min: 500 1st speed : 41...83 1/min: 250 Oveflow 2nd speed cm3/10s: (26...98) Del.quantity cm3/: quantity 1000H: 95.0 1/min: 1100 2nd speed max. Overflow | : 55...138 quantity cm3/10s: (40...153) Shutoff electromagnet: Delivery-quant. and breakaway char.: Cut-in : 10.0 min. voltage 1/min: 1300 Rated voltage : 12.0 1st speed Del.quantity cms/: 0 cm3/: 0.0...3.0 Mounting and assembly dimensions: 1/min: 1175 2nd speed 2nd special Deliquantity cms/: 12000H.: cm3/: 15.0...55.0 Designation K mm KF : 5.0...5.4 1/min: 1150 3rd speed UM cm3/: 56.0...62.0 1000H.: (53.0...65.0) : 1.2...1.6 Del.quantity MS mm SVS max. : 1.8 mm : 18.8...20.8 1/min: 1100 XK mm 4th speed Del.quantity cm3/: 69.3....74.0) : 11.9...15.3 XL mm 5th speed 1/min: 900 Del.quantity cm3/: 71.5...74.5 1000H.: (69.5...76.5) Remarks: Heavy-duty fuel-injection pump for DI-engines: only test using timing-1/min: 750 device-travel measuring device with 6th speed metal jacket 7th speed 1/min: 500 Del.quantity cm3/: 81.0...89.0 1000H.: (79.0...91.0) Zero delivery (stop): Mech. shutoff: Speed 1/min: 1100 Del.quantity cm3/: 0..3 1000H.: -Electr. shutoff: **Speed** 1/min: 360 volt: -Del.quantity cm3/: 0.0...3.0 max. 1000H.: -Idle delivery: 1/min: 360 1st speed Del.quantity cm3/: 8.0...14.0 1000н.: (6.0...16.0)

2nd speed

1/min: 450

## Note inst. in remarks column

Test sheet : CUM 5.9 W61 Edition : 21.06.90

replaces :-

Calibrating oil : ISO 4113

Injection pump : VE 6/12F1400 R377
Type number : 0 460 426 148
Customer Part-No. : 3 916 907

Customer-specific information

## Remarks:

Operate control lever after each manifold pressure compensator pressure change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

Test sheet : CUM 5.9 W62 Edition : 21.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 6/12F1400 R377

Type number : 0 460 426 148 Customer Part-No. : 3 916 907

Customer-specific information

Customer : CUM

: 68TA-5.9 IND. Engine

k: 143 Power 1/mi: 2500 Speed

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

assembly : 1 688 901 027

Opening

bar: 250...253 pressure

Perforated plate

mm: 0.5 diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

mm : 0.3Prestroke

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 2.4

mm: +-0.02(0.06)

**Outlet** : D

Injection pump setting values Test specifications in parentheses Timing-device travel:

Speed 1/min: 1100 Charge press. hPa: 1000 Setting value mm: 1.5...1.9

Supply-pump pressure:

Speed 1/min: 1100 Charge press. hPa: 1000 Setting value bar: 6.3...6.9

Full-load del. with charge press.:

1/min: 850 Speed Charge press. hPa: 1000 Del.quantity cm3/

1000H.: 82.5...83.5

cm3/: 4.0Dispersion 1000H : (4.5)

Full-load del. w/out charge press.:

 $1/\min : 500$ Speed

Del.quantity cm3/

1000H.: 73.0...74.0

Low-idle speed regulation:

Speed 1/min: 375

Deliquantity cm3/

1000H.: 8.0...14.0 cm3/: 5.5

Dispersion

1000H.: (7.0)

Full-load speed regulation:

1/min: 1510 Charge press. hPa: 1000 Del.quantity cm3/ 1000H: 56.0...62.0

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 100.0

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 1000 1st speed Charge press. hPa: 1000

TD travel mm: 0.8...1.6 mm: (0.5...1.9)

1/min: 1100 2nd speed Charge press. hPa: 1000

TD travel mm: 1.51.9	+	Charge press. hPa: 1000
mm: (1.02.4)  3rd speed 1/min: 1400	1	Del.quantity cm3/: 82.583.5 1000H.: (80.086.0)
3rd speed 1/min: 1400	+	1000H.: (80.086.0)
Charge press. hPa: 1000	1	8th speed 1/min: 700
TD travel mm: 2.73.5	1	Charge press hPa: 550
mm: (2.43.8)	1	Charge press. hPa: 550 Del.quantity cm3/: 79.580.5
1811. (E.4J.U)	Ι	1000H: (76.084.0)
Supply-pump pressure characteristic:	I	Oth speed 1/min: 500
supply pulip pressure characteristic.	T	9th speed 1/min: 500 Del.quantity cm3/: 73.074.0
1st annual 1/mins 500	T	1000H: (69.577.5)
1st speed 1/min: 500	Ť	1000n: (07.3(1.3)
Charge press. hPa: 1000	†	Toma dalinami (aban)
Supply-pump	Ť	Zero delivery (stop):
pressure bar: 3.54.1	†	and the state of t
2nd speed 1/min: 1100	†	Mech. shutoff:
Charge press. hPa: 1000	+	4/1 4/00
Supply-pump pressure bar: 6.369	+	Speed 1/min: 1400
pressure bar: 6.369	+	Del.quantity cm3/: 03
3rd speed 1/min: 1400	+	1000H.: -
Charge press. hPa: 1000	+	
Supply-pump	+	Electr. shutoff:
pressure bar: 7.78.3	+	
		Speed 1/min: 375
Overflow quantity at overflow valve:	+	ELAB volt: -
•	+	Del.quantity cm3/: 0.03.0
1st speed 1/min: 500	+	max. 1000H.: -
Oveflow : 4183	+	
quantity cm3/10s: (2698)	1	Idle delivery:
2nd speed 1/min: 1400	1	2010 101110171
Charge press. hPa: 1000	1	1st speed 1/min: 375
Overflow : 55138	1	Del quantity cm3/: 8 0 14 0
quantity cm3/10s: (40153)	$\perp$	Del.quantity cm3/: 8.014.0 1000H.: (6.016.0)
qualities cally ros. (45.11.155)	$\perp$	2nd speed 1/min: 450
Delivery-quant. and breakaway char.:	$\perp$	Del.quantity cm3/: 0.04.0
becivery quare: and breakaway criar	1	1000H.: -
1st speed 1/min: 700	I	100011.
Charge-air pressure-setting	Ι	Automatic starting fuel delivery:
point hPa: 550	T	Additional State ing fact decivery.
Del.quantity cm3/: 79.580.5	I	1st speed 1/min: 240
1000H.: (76.084.0)		Del.quantity cm3/: -
	T	
	T	ind. 1000H: 90.0
Charge press. hPa: 1000	T	2nd speed 1/min: 370
Del.quantity cm3/: 0.03.0	T	2nd speed 1/min: 370
1000H.: -	T	Del.quantity cm3/: - max. 1000H : 100.0
3rd speed 1/min: 1550	T	max. 1000H : 100.0
Charge press. hPa: 1000	T	Chitoff alastromagnet:
Del.quantity cm3/: 15.055.0	T	Shutoff electromagnet:
1000H.: -	T	Orabe dia
4th speed 1/min: 1510	T	Cut-in
Charge press. hPa: 1000	†	min. voltage : 10.0
Del.quantity cm3/: 56.062.0	†	Rated voltage : 12.0
1000H.: (53.065.0)	† .	
5th speed 1/min: 1400	† '	Mounting and assembly dimensions:
Charge press. hPa: 1000	†	
Del.quantity cm3/: 75.578.5		Designation
1000H.: (74.080.0)		K mm : -
6th speed 1/min: 1100		MS mm : 0.81.2
Charge press. hPa: 1000	†	SVS max. mm : 3.6
Del.quantity cm3/: 80.083.0	+	
1000H.: (78.085.0)	+ 1	Remarks:
7th speed 1/min: 850	+	

Operate control lever after each manifold-pressure compensator pressure change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

Test sheet : CUM 5.9 W57 Edition : 19.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 6/12F1250 R373-4

: 0 460 426 150 Type number

Customer-specific information

Customer : CUM

: 6BT-590 Engine

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer : 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated-plate

diameter mm:0.5

Test ini. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke

e mm: 0.3 (from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.85

mm: +-0.02(0.04)

Outlet

Injection pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 750 Speed Charge press. hPa: 1000 Setting value mm: 1.4...1.8

Supply-pump pressure:

1/min: 750 Speed Charge press. hPa: 1000 Setting value bar: 3.2...3.8

Full-load del. with charge press.:

1/min: 750 Speed Charge press. hPa: 1000 Del.quantity cm3/ 1000H.: 82.0...83.0

cm3/: 4.0Dispersion 1000H: (4.5)

Full-load del. w/out charge press.:

1/min : 500 Speed

Del.quantity cm3/ 1000H.: 40.0...41.0

Low-idle speed regulation:

1/min: 375 Speed Del.quantity cm3/

1000H.: 4.0...8.0

cm3/: 5.5 Dispersion 1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1300 Charge press. hPa: 1000

Del.quantity cm3/

1000H: 65.0...71.0

Start:

1/min: 100 Speed mind cm3/1000H.: 70.0

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 600 1st speed Charge press. hPa: 1000

mm: 0.4...1.2 TD travel mm: (0.1...1.5) 1/min: 750

2nd speed Charge press. hPa: 1000

mm: 1.4...1.8 TD travel mm: (0.9...2.3)

3rd speed 1/min: 1050 Charge press. hPa: 1000

mm: (2.03.4)	tharge press. nPa: 450  Del.quantity cm3/: 67.068.0
Supply-pump pressure characteristic:	1000H: (63.072.0) + 9th speed 1/min: 500
1st speed 1/min: 500 Charge press. hPa: 1000	Del.quantity cm3/: 40.041.0 1000H: (36.045.0)
Supply-pump pressure bar: 2.12.7	Zero delivery (stop):
2nd speed 1/min: 750	Mech. shutoff:
Charge press. hPa: 1000 Supply-pump	Speed 1/min: 1250
pressure bar: 3.23.8 3rd speed 1/min: 1050	Del.quantity cm3/: 03
Charge press. hPa: 1000 Supply-pump	Electr. shutoff:
pressure bar: 4.34.9	+ Speed 1/min: 375
Overflow quantity at overflow valve:	+ ELAB volt: - Del.quantity cm3/: 0.03.0
1st speed 1/min: 500 Oveflow : 4183	1000H.: -
quantity cm3/10s: (2698) 2nd speed	Idle delivery:
Charge press. hPa: 1000 Overflow : 55138	+ Mfg. date: until : - + 1st speed 1/min: 375
quantity cm3/10s: (40153)	Del.quantity cm3/: 4.08.0 1000H.: (1.011.0)
Delivery-quant. and breakaway char.:	+ 2nd speed 1/min: 500 + Del.quantity cm3/: 0.04.0
1st speed 1/min: 700* Charge-air pressure-setting	1000H.: -
point hPa: 450 Del.quantity cm3/: 67.068.0	Automatic starting fuel delivery:
1000H.: (63.072.0) 2nd speed 1/min: 1400	1st speed 1/min: 200 ind. 1000H: 60.0
Charge press. hPa: 1000	2nd annual 1/min 770
Del.quantity cm3/: 0.03.0 1000H.: -	+ 2nd speed 1/min: 370 + max. 1000H: 60.0
3rd speed 1/min: 1330 Charge press. hPa: 1000	† Shutoff electromagnet:
Del.quantity cm3/: 15.055.0 1000H.: -	+ Cut-in
4th speed 1/min: 1300 Charge press. hPa: 1000	min. voltage : 10.0 Rated voltage : 12.0
Del.quantity cm3/: 65.071.0 1000H.: (62.074.0)	+ Mounting and assembly dimensions:
5th speed 1/min: 1250	
Charge press. hPa: 1000 Del.quantity cm3/: 73.576.5	+ Designation + K mm : -
1000H.: (72.078.0) 6th speed 1/min: 1050	+ KF mm : 5.05.4 + MS mm : 1.21.6
Charge press. hPa: 1000 Del.quantity cm3/: 78.081.0	+ SVS max. mm : 2.2
1000H.: (76.582.5)	Remarks:
Charge press. hPa: 1000	Operate control lever after each manifold pressure compensator pressure
Del.quantity cm3/: 82.083.0 1000H.: (79.585.5)	t change.
8th speed 1/min: 700	<pre>* Correction at adjusting nut (46)</pre>

Note inst. in remarks column

Test sheet : CUM 5.9 W59 Edition : 19.06.90

replaces

: ISO 4113 Calibrating oil

Injection pump : VE 6/12F1100 R373-5

: 0 460 426 151 Type number

Customer-specific information

Customer : CLM

: 6BT 5.9 IND. Engine

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 : 42...50 electronically

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated-plate

mm: 0.5 diameter

Test inj. tubing : 1 688 901 027

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm : 0.3

(from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.85

mm: +-0.02(0.06)

Outlet : D

Injection pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 750 Speed Charge press. hPa: 1000 Setting value mm: 1.3...1.7

Supply-pump pressure:

1/min: 750 Charge press. hPa: 1000 Setting value bar: 3.2...3.8

Full-load del. with charge press.:

1/min: 750 Speed Charge press. hPa: 1000 Del.quantity cm3/ 1000H.: 83.0...84.0

cm3/ : 4.0 Dispersion 1000H: (4.5)

Full-load del. w/out charge press.:

1/min: 500 Speed

Del.quantity cm3/

1000H.: 67.5...68.5

cm3/: 9.0Dispersion 1000H .: -

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/

1000H.: 9.0...13.0

cm3/: 5.5 Dispersion 1000H .: (7.0)

Full-load speed regulation:

1/min: 1150 Speed Charge press. hPa: 1000 Del.quantity cm3/ 1000H: 60.0...66.0

Start:

1/min: 100 Speed mind cm3/1000H.: 80.0

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 600 Charge press. hPa: 1000 TD travel

mm: 0.4...1.2mm: (0.1...1.5)
2nd speed 1/min: 750
Charge press. hPa: 1000

mm: 1.3...1.7 TD travel mm: (0.8...2.2)

1/min: 1100 3rd speed

thange press. nra: 1000	Change pages 178811: 700
TD travel mm: 2.23.0	Charge press. hPa: 400
mm: (1.93.0)	Del.quantity cm3/: 77.578.5
+	1000H: (73.582.5)
Supply-pump pressure characteristic:	9th speed 1/min: 500
	Del.quantity cm3/: 67.568.5
1st speed 1/min: 600	1000H: (63.572.5)
	100011. (03.312.37
Charge press. hPa: 1000	Toma dalanna (nem)
Supply-pump +	Zero delivery (stop):
pressure bar: 2.63.2	
2nd speed 1/min: 750 +	Mech. shutoff:
Charge press. hPa: 1000	
Supply-pump +	Speed 1/min: 1100
macoune ham 7.2. 7.9	
pressure bar: 3.23.8	Del.quantity cm3/: 03
3rd speed 1/min: 1100 +	1000н.: -
Charge press. hPa: 1000	
Supply-pump +	Electr. shutoff:
pressure bar: 4.75.3	
1	Speed 1/min: 375
A conflor manhitus at a conflor contract	
Overflow quantity at overflow valve:	ELAB volt: -
†	Del.quantity cm3/: 0.03.0
1st speed 1/min: 500	max. 1000H.: -
Oveflow : 4183	
quantity cm3/10s: (2698)	Idle delivery:
2nd aread 1/min 1100	race activaty.
2nd speed 1/min: 1100	ME . december 20
Charge press. hPa: 1000	Mfg. date: until : -
Overflow : 55138 +	1st speed 1/min: 375
quantity cm3/10s: (40153)	Del.quantity cm3/: 9.013.0
1	1000H.: (6.016.0)
Delivery and breaker by shop	2nd speed 1/min: 500
Delivery-quant. and breakaway char:	
	Del.quantity cm3/: 0.04.0
1st speed 1/min: 700*	1000н.: -
Charge-air pressure-setting +	
100	Automatic starting fuel delivery:
point nea: 41) +	MULLINGE IS SECRETARY LICEL VELIVERY.
point hPa: 400	Additional State ing Tues desirety.
Del.quantity cm3/: 77.578.5	
Del.quantity cm3/: 77.578.5 + 1000H.: (73.582.5)	1st speed 1/min: 280
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260	
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000	1st speed
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000	1st speed
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0	1st speed
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0	1st speed
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: - 3rd speed 1/min: 1200	1st speed
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: - 3rd speed 1/min: 1200 Charge press. hPa: 1000	1st speed
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: - 3rd speed 1/min: 1200 Charge press. hPa: 1000 Del.quantity cm3/: 15.055.0	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: - 3rd speed 1/min: 1200 Charge press. hPa: 1000	1st speed
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: - 3rd speed 1/min: 1200 Charge press. hPa: 1000 Del.quantity cm3/: 15.055.0	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet: Cut-in
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: - 3rd speed 1/min: 1200 Charge press. hPa: 1000 Del.quantity cm3/: 15.055.0 1000H.: - 4th speed 1/min: 1150	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: - 3rd speed 1/min: 1200 Charge press. hPa: 1000 Del.quantity cm3/: 15.055.0 1000H.: - 4th speed 1/min: 1150 Charge press. hPa: 1000	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet: Cut-in
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: - 3rd speed 1/min: 1200 Charge press. hPa: 1000 Del.quantity cm3/: 15.055.0 1000H.: - 4th speed 1/min: 1150 Charge press. hPa: 1000 Del.quantity cm3/: 60.066.0	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0
Del.quantity cm3/: 77.578.5 1000H.: (73.582.5) 2nd speed 1/min: 1260 Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: - 3rd speed 1/min: 1200 Charge press. hPa: 1000 Del.quantity cm3/: 15.055.0 1000H.: - 4th speed 1/min: 1150 Charge press. hPa: 1000 Del.quantity cm3/: 60.066.0 1000H.: (57.069.0)	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000  Del.quantity cm3/: 78.581.5	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : -
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000  Del.quantity cm3/: 78.581.5  1000H.: (77.083.0)	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : - KF mm : 5.05.4
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000  Del.quantity cm3/: 78.581.5  1000H.: (77.083.0)  6th speed 1/min: 900	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : -
Del.quantity cm3/: 77.578.5	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : - KF mm : 5.05.4 MS mm : 1.01.4
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000  Del.quantity cm3/: 78.581.5  1000H.: (77.083.0)  6th speed 1/min: 900  Charge press. hPa: 1000  Del.quantity cm3/: 80.583.5	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : - KF mm : 5.05.4
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000  Del.quantity cm3/: 78.581.5  1000H.: (77.083.0)  6th speed 1/min: 900  Charge press. hPa: 1000  Del.quantity cm3/: 80.583.5	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : - KF mm : 5.05.4 MS mm : 1.01.4
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000  Del.quantity cm3/: 78.581.5  1000H.: (77.083.0)  6th speed 1/min: 900  Charge press. hPa: 1000  Del.quantity cm3/: 80.583.5  1000H.: (79.085.0)	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : - KF mm : 5.05.4 MS mm : 1.01.4  Remarks:
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000  Del.quantity cm3/: 78.581.5  1000H.: (77.083.0)  6th speed 1/min: 900  Charge press. hPa: 1000  Del.quantity cm3/: 80.583.5  1000H.: (79.085.0)  7th speed 1/min: 750	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : - KF mm : 5.05.4 MS mm : 1.01.4  Remarks:  Operate control lever after each
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000  Del.quantity cm3/: 78.581.5  1000H.: (77.083.0)  6th speed 1/min: 900  Charge press. hPa: 1000  Del.quantity cm3/: 80.583.5  1000H.: (79.085.0)  7th speed 1/min: 750  Charge press. hPa: 1000	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : - KF mm : 5.05.4 MS mm : 1.01.4  Remarks:  Operate control lever after each manifold—pressure compensator pressure
Del.quantity cm3/: 77.578.5  1000H.: (73.582.5)  2nd speed 1/min: 1260  Charge press. hPa: 1000  Del.quantity cm3/: 0.03.0  1000H.: -  3rd speed 1/min: 1200  Charge press. hPa: 1000  Del.quantity cm3/: 15.055.0  1000H.: -  4th speed 1/min: 1150  Charge press. hPa: 1000  Del.quantity cm3/: 60.066.0  1000H.: (57.069.0)  5th speed 1/min: 1100  Charge press. hPa: 1000  Del.quantity cm3/: 78.581.5  1000H.: (77.083.0)  6th speed 1/min: 900  Charge press. hPa: 1000  Del.quantity cm3/: 80.583.5  1000H.: (79.085.0)  7th speed 1/min: 750	1st speed 1/min: 280 ind. 1000H: 80.0  2nd speed 1/min: 440 max. 1000H: 80.0  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : - KF mm : 5.05.4 MS mm : 1.01.4  Remarks:  Operate control lever after each

\* Correction at adjusting nut (46)

Note inst. in remarks column

: CUM 5.9 W58 Test sheet Edition : 21.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 6/12F1100 R373-5

: 0 460 426 151 Type number Customer Part-No.: 3 916 911

Customer-specific information

Customer : CUM

: 6BT 5.9 IND. Engine

k: 128 Power 1/mi: 2200 Speed

TEST BENCH REQUIREMENTS

Calibrating-oil return temp. °C

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

assembly : 1 688 901 027

Opening

bar: 250...253 pressure

Perforated-plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm : 0.3

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.85

mm: +-0.02(0.06)

Outlet : D

Injection-pump setting values Test specifications in parentheses Timing-device travel:

1/min: 750 Charge press. hPa: 1000 Setting value mm: 1.3...1.7

Supply-pump pressure:

1/min: 750 Speed Charge press. hPa: 1000 Setting value bar: 3.2...3.8

Full-load del. with charge press.:

1/min: 750 Speed Charge press. hPa: 1000

Del.quantity cm3/ 1000H.: 83.0...84.0

cm3/ : 4.0 1000H : (4.5) Dispersion

Full-load del. w/out charge press.:

 $1/\min : 500$ Speed

Del.quantity cm3/ 1000H.: 67.5...68.5

cm3/: 9.0 Dispersion

1000H.: (9.0)

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/ 1000H.: 9.0...13.0 Dispersion cm3/: 5.5 1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1150 Charge press. hPa: 1000

Del.quantity cm3/ 1000H: 60.0...66.0

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 80.0 mind

Inspection pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 600 Charge press. hPa: 1000 mm: 0.4...1.2 TD travel

mm: (0.1...1.5)

2nd speed 1/min: Charge press. hPa: TD travel mm: 3rd speed 1/min: Charge press. hPa: TD travel mm: mm: Supply-pump pressure 1st speed 1/min: Charge press. hPa:	1000 1.31.7 (0.82.2) 1100 1000 2.23.0 (1.93.3) e characteristic:	<del></del>	7th speed Charge press Del.quantity 8th speed Charge press Del.quantity	1000H.: 1/min: hPa: cm3/: 1000H.: 1/min: hPa: cm3/: 1000H: 1/min: cm3/:	1000 83.084.0 (80.586.5) 700 400 77.578.5 (73.582.5)
Supply-pump		+			
pressure bar: 2nd speed 1/min: Charge press. hPa: Supply-pump	750	+ + + + + + + + + + + + + + + + + + + +	Zero delivery Mech. shutoff	·	) <b>:</b>
pressure bar: 3rd speed 1/min:	3.23.8 1100	+	Speed Del.quantity	1/min: cm3/: 1000H.:	03
Charge press. hPa: Supply-pump		Ŧ			_
pressure bar:	4.75.3	1	Electr. shutc	off:	
Overflow quantity at	t overflow valve:	I	Speed ELAB	1/min: volt:	
1st speed 1/min: Oveflow : quantity cm3/10s:	4183	+	Del.quantity max.	cm3/:	0.03.0
2nd speed 1/min:	1100	Ŧ	Idle delivery	<b>/:</b>	
Charge press. hPa: Overflow:	1000	1	1st speed	1/min.	775
quantity cm3/10s:	(40153)	Ŧ	Del.quantity	cm3/:	9.013.0
Delivery-quant. and	•	†	2nd speed Del.quantity	1/min:	500
1st speed 1/min:		†	1	OOOH.:	<del></del>
Charge-air pressure- point hPa: Del.quantity cm3/:	400	Ī	Automatic sta	erting f	uel delivery:
1000H.:	(73.582.5)	+		1/min:	
2nd speed 1/min: Charge press. hPa:	1000	‡	Del.quantity ind.	cm3/: 1000H:	80.0
Del.quantity cm3/: 1000H.:	0.05.0	‡	2nd speed	1/min:	440
3rd speed 1/min:		+	Del quantity	cm3/:	-
Charge press. hPa: Del.quantity cm3/:		<u>†</u>	max. 1	000H:	80.0
1000H.: 4th speed 1/min:		Ī	Shutoff elect	romagne	et:
Charge press. hPa:		Į	Cut-in		
Del.quantity cm3/:	60.066.0	+	min. voltage		10.0
5th speed 1/min:	(57.069.0) 1100	1	Rated voltage		12.0
Charge press. hPa:	1000	+	Mounting and	assembl	y dimensions:
Deliquantity cm3/:	78.581.5 (77.083.0)	<b>†</b>	Designation		
6th speed 1/min:		I	K Signal for	mm :	
Charge press. hPa:		+	KF MS	mm :	5.05.4 1.01.4

Remarks: Operate control lever after each manifold-pressure compensator pressure change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

Test sheet : CUM 5.9 W49 Edition : 03.05.90

replaces

Calibrating oil : ISO 4113

: VE 6/12F1100 R381-2 Injection pump

Type number : 0 460 426 154 Customer Part-No.: 3 917 011

Customer-specific information

Customer : CDC

: 6 BT - 5.9 IND.Engine

k: 93.0 1/mi: 2300 Power Speed

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated plate

diameter mm: 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6 x Wall thickness : 2 mm: 840 x Length

Start of delivery

Prestroke mm: 0.3

(from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.5

mm: +-0.02(0.06)

**Outlet** : D

Injection-pump setting values Test specifications in parentheses Timing-device travel:

1/min: 750 Setting value mm: 3.4...3.8

Supply-pump pressure:

1/min: 750 Speed Setting value bar: 3.5...4.1

Full-load del. w/out charge press.:

1/min: 750 Speed

Deliquantity cm3/

1000H.: 61.0...62.0

Dispersion cm3/: 4.0 1000H.: (4.5)

Low-idle speed regulation:

1/min: 375 Speed

Del.quantity cm3/ 1000H.: 10.0...12.0

cm3/: 5.5 Dispersion 1000H.: (7.0)

Full-load speed regulation:

1/min: 1150

Deliquantity cm3/

1000H: 39.0...45.0

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 75.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 500

mm: 1.5...2.3 TD travel

mm: (1.2...2.6)

2nd speed 1/min: 750

TD travel mm: 3.4...3.8 mm: (2.9...4.3)

3rd speed

1/min: 1100 mm: 5.6...6.4 TD travel

mm: (5.3...6.7)

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 2.4...3.0 pressure

1/min: 750 2nd speed

Supply-pump bar: 3.5...4.1 pressure 3rd speed 1/min: 1100 Supply-pump bar: 4.8...5.4 pressure Overflow quantity at overflow valve: 1/min: 500 1st speed Oveflow : 41...83 cm3/10s: (26...98) quantity 1/min: 1100 2nd speed Overflow : 55...138 quantity cm3/10s: (40...153) Delivery-quant. and breakaway char.: 1/min: 1250 1st speed cm3/: 0.0...3.0 Del.quantity 1000H .: -1/min: 1170 2nd speed Del.quantity cm3/: 15.0...55.0) 1/min: 1150 cm3/: 39.0...45.0 3rd speed Del.quantity 1000H.: (36.0...48.0) 1/min: 1150 4th speed Del.quantity cm3/: 56/3....63.0) 5th speed 1/min: 1100 cm3/: 60,0...63,0 Del.quantity 1000H.: (59.5...66.5) 1/min: 750 6th speed cm3/: 62.0...63.0 Del.quartity 1000H.: (59.5...65.5) 7th speed 1/min: 500 Del.quantity cm3/: 57.0...65.0 1000H.: -Zero delivery (stop): Mech. shutoff: Speed 1/min: 1100 Del.quantity cm3/: 0..3 1000H .: -Electr. shutoff: 1/min: 375 Speed ELAB volt: -Del.quantity cm3/: 0.0...3.0 1000H .: max. Idle delivery: 1st speed 1/min: 375 Del.quantity cm3/: 10...12 1000H.: (6.0...16.0) 1/min: 500 2nd speed

Del.quantity cm3/: 0.0...4.0 1000H.: (0.0...4.0) Automatic starting fuel delivery:

1st speed 1/min: 130 Del.quantity cm3/: ind. 1000H: 70.0

2nd speed 1/min: 300 Del.quantity cm3/: - max. 1000H: 80.0

Shutoff electromagnet:

Cut-in

min. voltage : 10.0 Rated voltage : 12.0

Mounting and assembly dimensions:

Designation

K mm : KF mm : 5.0...5.4
MS mm : 1.2...1.6

SVS max. mm :

Remarks:

Note inst. in remarks column

: CUM 5,9 W25 Test sheet Edition : 18.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 6/12F1100 R371-1

: 0 460 426 158 Type number

Customer-specific information

Customer

: CASE

Engine

: 6T-590

TEST BENCH REQUIREMENTS

Calibrating oil return temp.

with thermometer : 40...48 electronically : 42...50

Inlet press., bar: 0,35

Calibrating nozzle-holder

assembly : 1 688 901 027

Opening |

bar: 250...253 pressure

Perforated-plate

diameter mm: 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6 x Wall thickness : 2 mm : 840 x Length

Start of delivery

Prestroke mm: 0,2 (from BDC): +0,02(0,04)

Start of delivery block Piston stroke mm: 1,5

mm: +-0.02(0.06)

: D Outlet

Injection pump setting values Test specifications in parentheses

Timing-device travel:

Speed 1/min: 750 Setting value mm: 3,1...3,5

Supply-pump pressure:

1/min: 750 Speed Setting value bar: 4,9...5,5

Full-load del. w/out charge press.:

 $1/\min : 750$ Speed

Del.quantity cm3/ 1000H.: 57,5...58,5 Dispersion cm3/: 4,0

1000H.: (4,5)

Low-idle speed regulation:

Speed 1/min: 450

Del.quantity cm3/ 1000H.: 9,0...13,0 Dispersion cm3/: 5,5 1000H.: (7,0)

Full-load speed regulation:

1/min: 1160 Speed

Del.quantity cm3/ 1000H: 37,0...43,0

Start:

Speed 1/min: 100 Del.quantity

mind cm3/1000H.: 65,0

Inspection pump test specifications Test specifications in parentheses

Timing device characteristic:

1st speed 1/min: 500

TD travel mm: 1,0...1,8 mm: (0,7...2,1) 1/min: 750

2nd speed

TD travel

mm: 3,1...3,5 mm: (2,6...4,0) 1/min: 1100

3rd speed

mm: 5,4...6,2 mm: (5,1...6,5) TD travel

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 3,8...4,4 1/min: 750 pressure

2nd speed

Supply-pump

bar: 4,9...5,5 1/min: 1100 pressure

3rd speed

Supply-pump bar: 6,4...7,0 pressure Overflow quantity at overflow valve: 1/min: 500 1st speed Oveflow : 41...83 cm3/10s: (26...98) quantity 1/min: 1100 2nd speed Overflow : 55...138 quantity cm3/10s: (40...153) Delivery quant. and breakaway char.: 1/min: 1230 1st speed Del.quantity cm3/: 0,0...3,0 1000H.: -1/min: 1180 Zna special Deliquantity cm3/: 1. 1000H.: -2nd speed cm3/: 13,0...33,0 3rd speed 1/min: 1160 Del.quantity cm3/: 37,0...43,0 1000H.: (34,0...46,0) 1/min: 1100 4th speed Del.quantity cm3/: >>....60,0) 5th speed 1/min: 750
Del.quantity cm3/: 57,5...58,5
1000H.: (55,0...61,0) 1/min: 500 6th speed Del.quantity cm3/: 40,5...48,5 1000H.: (38,5...50,5) Zero delivery (stop): Electr. shutoff: 1/min: 425 Speed ELAB volt: -Del.quantity cm3/: 0,0...3,0 1000H.: max. Idle delivery: 1/min: 450 1st speed Del.quantity cm3/: 7,0....(6,0...16,0) 1/min: 550 2nd speed Del.quantity cm3/: 0,0...4,0 1000H.: -Automatic starting fuel delivery: 1st speed 1/min: 180

cm3/: -

1000H; 65.0

1/min: 350

Del.quantity cm3/: - max. 1000H : 57,5 Shutoff electromagnet: Cut-in min. voltage : 10,0 Rated voltage : 12,0 Mounting and assembly dimensions: Designation K mm 5,0...5,4 KF mm : 0,8...1,2 MS mm SVS max. mm : 4,1 : 18,8...20,8 XK mm : 10,2...13,6 XL mm Heavy-duty fuel-injection pump for DI-engines: only test using timingdevice-travel measuring device with metal jacket

Del.quantity

ind.

2nd speed

Note inst. in remarks column

Test sheet : CUM 5.9 W16 Edition : 21.06.90

replaces :

Calibrating oil : ISO 4113

Injection pump : VE 6/12F1100 R367-2

Type number : 0 460 426 165 Customer Part-No. : 3 916 939

Customer-specific information

Customer : CUM

Engine : 6BTA 5.9 IND.

Power k: 105 Speed 1/mi: 2200

TEST BENCH REQUIREMENTS

Calibrating oil return temp. °C

with thermometer : 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

assembly : 1 688 901 027

Opening

pressure bar: 250...253

Perforated-plate

diameter mm: 0.5

Test ini. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 x Length mm : 840.0

Start of delivery

Prestroke mm: 0.3

(from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.5

mm: +-0.02(0.06)

Outlet : D

Injection pump setting values Test specifications in parentheses Timing-device travel:

Speed 1/min: 750 Setting value mm: 3.8...4.2

Supply-pump pressure:

Speed 1/min: 750

Setting value bar: 3.6...4.2

Full-load del. w/out charge press.:

Speed 1/min: 750

Del.quantity cm3/

1000H.: 69.0...70.0

Dispersion cm3/: 4.0

1000H.: (4.5)

Low-idle speed regulation:

Speed 1/min: 375

Del.quantity cm3/

1000н.: 8.0...14.0

Dispersion cm3/: 5.5 1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1150

Del.quantity cm3/

1000H: 52.5...58.5

Start:

Speed 1/min: 100 Del.quantity : - mind cm3/1000H.: 60.0

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 500

TD travel mm: 1.6...2.4 mm: (1.3...2.7)

2nd speed 1/min: 750

TD travel mm: 3.8...4.2 mm: (3.3...4.7)

3rd speed 1/min: 1100

TD travel mm: 6.0...6.8 mm: (5.7...7.1)

Supply-pump pressure characteristic:

1st speed 1/min: 500

Supply-pump

pressure bar: 2.4...3.0

2nd speed 1/min: 750

Supply-pump bar: 3.6...4.2 pressure 3rd speed 1/min: 1100 Supply-pump bar: 5.1...5.7 pressure Overflow quantity at overflow valve: 1st speed 1/min: 500 Oveflow : 41...83 cm3/10s: (26...98) quantity 1/min: 1100 2nd speed Overflow : 55...138 quantity cm3/10s: (40...153) Delivery-quant. and breakaway char .: 1/min: 1220 1st speed Del.quantity cm3/: 0.0...3.0 1000H .: -1/min: 1180 cm3/: 0.0...15.0 2nd speed 2nd spect Del.quantity cms/. L 1000H.: -1/min: 1150 3rd speed Del.quantity cm3/: >2.3....61.5) 1/min: 1100 4th speed Del.quantity cm3/: 63.5...66.5 1000H.: (62.0...68.0) 1/min: 900 5th speed Del.quantity cm3/: 05.3....71.5) 1/min: 750 6th speed Del.quantity cm3/: 69.0....72.5) 1/min: 500 7th speed Del.quantity cm3/: 67.5...75.5 1000H.: (65.5...77.5) Zero delivery (stop): Mech. shutoff: 1/min: 1250 Speed Del.quantity cm3/: 0..3 1000H.: -Electr. shutoff: 1/min: 375 Speed volt: -ELAB Del.quantity cm3/: 0.0...3.0 max. 1000H.: -Idle delivery: 1/min: 375 1st speed cm3/: 8.0...14.0 Del.quantity 1000H.: (6.0...16.0)

1/min: 520

Del.quantity cm3/: 0.5...4.5 1000H.: -

Automatic starting fuel delivery:

1st speed 1/min: 130 Del.quantity cm3/: ind. 1000H: 65.0

2nd speed 1/min: 250 Del.quantity cm3/: - max. 1000H: 60.0

Shutoff electromagnet:

Cut-in

min. voltage : 10.0 Rated voltage : 12.0

Mounting and assembly dimensions:

Designation

K mm : -KF mm : 5.0...5.4 MS mm : 1.0...1.4

Remarks:

Heavy-duty fuel-injection pump for DI-engines: only test using timing-device-travel measuring device with metal jacket

2nd speed

Note inst. in remarks column

: CUM 5.9 W11 Test sheet Edition : 18.06.90

replaces

Calibrating oil : ISO 4113

: VE 6/12F1250 R367-2 Injection pump

: 0 460 426 165 Type number

Customer-specific information

Customer

: CDC

Engine

: 6BT-5.9 IND.

TEST BENCH REQUIREMENTS

Calibrating-oil return temp. °C

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm : 0.3

(from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.5 mm: +-0.02(0.06)

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 750 Speed

Setting value mm: 3.8...4.2

Supply-pump pressure:

1/min: 750 Setting value bar: 3.6...4.2

Full-load del. w/out charge press.:

1/min: 750 Speed

Del.quantity cm3/ 1000H.: 62.0...63.0

cm3/: 4.0 Dispersion

1000H.: (4.5)

Low-idle speed regulation:

1/min: 400 Speed

Del.quantity cm3/ 1000H.: 6.0...12.0

Full-load speed regulation:

Speed 1/min: 1300

Del.quantity cm3/ 1000H: 48.0...54.0

Start:

1/min: 100 Speed Del.quantity

mind cm3/1000H.: 60.0

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 500

TD travel mm: 1.6...2.4 mm: (1.3...2.7)

1/min: 750 2nd speed

TD travel mm: 3.8...4.2 mm: (3.3...4.7)

1/min: 1100 3rd speed

TD travel mm: 6.0...6.8 mm: (5.7...7.1)

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 2.4...3.0 1/min: 750 pressure

2nd speed

Supply-pump

pressure bar: 3.6...4.2

3rd speed 1/min: 1100

Supply-pump

bar: 5.1...5.7 pressure

Overflow quantity at overflow valve:

1/min: 500 1/min: 250 1st speed 2nd speed : 41...83 1000H: 60.0 Oveflow cm3/10s: (26...98) quantity 1/min: 1250 : 55...138 2nd speed Shutoff electromagnet: Overflow quantity cm3/10s: (40...153) Cut-in min. voltage : 10.0 Delivery-quant. and breakaway char.: Rated voltage : 12.0 1st speed 1/min: 1430 Mounting and assembly dimensions: Del.quantity cm3/: 0.0...3.0 1000H.: -Designation 1/min: 1360 2nd speed K m Del.quantity cm3/: 15.0...55.0 1000H.: -: 5.0...5,4 KF MS : 1,0...1,4 mm 1/min: 1300 cm3/: 48.0...54.0 SVS max. 3rd speed mm Del.quantity 1000H.: (45.0...57.0) Remarks: 1/min: 1250 4th speed cm3/: 57.5...60.5 Del.quantity Heavy-duty fuel-injection pump for 1000H.: (56.0...62.0) DI-engines: only test using timing-5th speed 1/min: 1100 Del.quantity cm3/: 59.5...63.5 1000H.: (57.5...65.5) device-travel measuring device with metal jacket 1/min: 750 6th speed 1/min: 500 7th speed Del.quantity cm3/: 56.0...64.0 1000H.: (54.0...66.0) Zero delivery (stop): Mech. shutoff: Speed 1/min: 1250 Deliquantity cm3/: 0..3 1000H.: -Electr. shutoff: 1/min: 400 Speed ELAB volt: -Del.quantity cm3/: 0.0...3.0 1000H.: max. Idle delivery: 1/min: 400 1st speed Del.quantity cm3/: 6.0...12.0 1000H.: (4.0...14.0) 1/min: 520 2nd speed Del.quantity cm3/: 0.5...4.5 1000H.: -Automatic starting fuel delivery: 1/min: 130 1st speed

1.1

E02

ind.

1000H: 65.0

Note inst. in remarks column

: CUM 5.9 W67 Test sheet Edition : 22.06.90

replaces

Calibrating oil : ISO 4113

: VE 6/12F1100 R402 Injection pump

Type number **: 0** 460 425 166

Customer-specific information

Customer : CUM

: 6BTA-590 I Engine

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer : 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Openina

bar: 250...253 pressure

Perforated-plate

mm: 0.5 diameter

Test ini. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

mm:0.3Prestroke

(from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.5

mm: +-0.02(0.06)

Outlet : D

Injection pump setting values Test specifications in parentheses

Timing-device travel:

Speed 1/min: 900 Charge press. hPa: 1000 Setting value mm: 4.8...5.2

Supply-pump pressure:

1/min: 900 Charge press. hPa: 1000 Setting value bar: 4.7...5.3

Full-load del. with charge press.:

1/min: 750 Speed Charge press. hPa: 1000

Del.quantity cm3/ 1000H: 71.5...72.5 Dispersion cm3/: 4.0 1000H: (4.5)

Full-load del. w/out charge press.:

1/min : 700 Speed

Del.quantity cm3/ 1000H.: 51.0...52.0

Low-idle speed regulation:

Speed 1/min: 400 Del.quantity cm3/ 1000H.: 7.0...13.0

cm3/: 5.5Dispersion

1000H.: (7.0)

Full-load speed regulation:

Speed 1/min: 1180 Charge press. hPa: 1000

Del.quantity cm3/

1000H: 47.0...53.0

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 75.0

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 750 Charge press. hPa: 1000 TD travel mm: 3.5...4.3

mm: (3.2...4.6)

2nd speed 1/min: 900 Charge press. hPa: 1000

mm: 4.8...5.2 mm: (4.3...5.5) TD travel

1/min: 1100 3rd speed

Charge press. hPa: 1000

TD travel mm: 6.27.0 mm: (5.97.3)	+ Charge press. hPa: 450 - Del.quantity cm3/: 64.565.5 + 1000H: (61.069.0)
Supply-pump pressure characteristic:	→ 9th speed 1/min: 700
1st speed 1/min: 750	Del.quantity cm3/: 51.052.0 1000H: (47.555.5)
Charge press. hPa: 1000	t Zana daliyany (atan):
Supply-pump pressure bar: 4.04.6	Zero delivery (stop):
2nd speed 1/min: 900	Mech. shutoff:
Charge press. hPa: 1000	+
Supply-pump pressure bar: 4.75.3	+ Speed 1/min: 1100
pressure bar: 4.75.3  3rd speed 1/min: 1100	+ Del.quantity cm3/: 03 + 1000H.: -
Charge press. hPa: 1000	+
Supply-pump	+ Electr. shutoff:
pressure bar: 5.56.1	+ Speed 1/min: 400
Overflow quantity at overflow valve:	Speed 1/min: 400 ELAB volt: - Del.quantity cm3/: 0.03.0 max. 1000H.: -  Idle delivery:  1st speed 1/min: 400 Del.quantity cm3/: 7.013.0 1000H.: (5.015.0)  2nd speed 1/min: 500 Del.quantity cm3/: 0.04.0 1000H.: -  Automatic starting fuel delivery:  1st speed 1/min: 250 Del.quantity cm3/: - ind. 1000H: 70.0  2nd speed 1/min: 400 Del.quantity cm3/: - 2000H: 75.0
over feet quarterly at ever feet vactor	Del.quantity cm3/: 0.03.0
1st speed 1/min: 750	+ max. 1000H.: -
Oveflow : 4183	Tall an alaberance
quantity cm3/10s: (2698) 2nd speed 1/min: 1100	idle delivery:
Charge press. hPa: 1000	1st speed 1/min: 400
Overflow : 55138	Del.quantity cm3/: 7.013.0 1000H.: (5.015.0)
quantity cm3/10s: (40153)	1000H.: (5.015.0)
Delivery-quant. and breakaway char.:	+ 2nd speed 1/min: 500 + Del.quantity cm3/: 0.04.0
becivery quarts and breakaway chais.	1000H.: -
1st speed 1/min: 700	+
Charge-air pressure-setting	+ Automatic starting fuel delivery:
point hPa: 450	1st speed 1/min: 250
Del.quantity cm3/: 64.565.5 1000H.: (61.069.0)	Del.quantity cm3/: -
2nd speed 1/min: 1250	ind. 1000H: 70.0
Charge press. hPa: 1000	† 3nd amount 1/min. (00
Del.quantity cm3/: 0.03.0 1000H.: -	- 2nd speed 1/min: 400 - Del.quantity cm3/: -
3rd speed 1/min: 1200	+ max. 1000H: 45.0
Charge press. hPa: 1000	+
Del.quantity cm3/: 22.537.5	Shutoff electromagnet:
4th speed 1/min: 1180	I Cut-in
Charge press. hPa: 1000	min. voltage : 10.0
Del.quantity cm3/: 47.053.0	Rated voltage : 12.0
1000H.: (44.056.0) 5th speed 1/min: 1100	+ Mounting and assembly dimensions:
5th speed 1/min: 1100 Charge press. hPa: 1000	T routering and assembly difficultations.
Del.quantity cm3/: 59.562.5	<pre>Designation</pre>
1000H.: (58.064.0)	+ K mm:-
6th speed 1/min: 900	+ KF mm : 5.05.4 + MS mm : 1.31.7
Charge press. hPa: 1000 Del.quantity cm3/: 61.564.5	+ MS mm : 1.31.7 + SVS max. mm : 3.0
1000H.: (59.566.5)	+ XK mm : 21.823.8
7th speed 1/min: 750	+ XL mm : 12.415.8
Charge press. hPa: 1000	† Romanka.
Del.quantity cm3/: 71.572.5 1000H.: (69.075.0)	min. Voltage : 10.0 Rated Voltage : 12.0  Mounting and assembly dimensions:  Designation K mm : - KF mm : 5.05.4 MS mm : 1.31.7 SVS max. mm : 3.0 XK mm : 21.823.8 XL mm : 12.415.8  Remarks:
8th speed 1/min: 700	Operate control lever after each
	•

manifold-pressure compensator pressure change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

: CUM 5,9 W17 Test sheet Edition : 18.06.90

replaces

Calibrating oil : ISO 4113

Injection pump : VE 6/12F1000 R369-1

: 0 460 426 167 Type number

Customer-specific information

Customer : CDC

: 68T-5.9 IND. Enaine

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer : 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated-plate

diameter mm: 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm : 0.3

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.5

mm: +-0.02(0.06)

Outlet : D

Injection pump setting values Test specifications in parentheses

Timing-device travel:

Speed 1/min: 750 Setting value mm: 3.5...3.9

Supply-pump pressure:

1/min: 750 Speed Setting value bar: 3.6...4.2

Full-load del. w/out charge press.:

1/min: 900 Speed

Del.quantity cm3/ 1000H.: 73.0...74.0

cm3/: 4.0Dispersion

1000H .: 4.5

Low-idle speed regulation:

1/min: 500 Speed

Del.quantity cm3/

1000H.: 4.0...10.0

cm3/: 3.5 1000H.: 7.0 Dispersion

Full-load speed regulation:

1/min: 1045

Del.quantity cm3/

1000H: 60.0...66.0

Start:

1/min: 100 Speed

Del.quantity cm3/1000H.: 70.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 500 1st speed

mm: 1.4...2.2 mm: (1.1...2.5) TD travel

2nd speed 1/min: 750

TD travel mm: 3.5...3.9

mm: (3.3...4.4)

1/min: 1000 3rd speed

TD travel

mm: 4.8...5.6 mm: (4.5...5.9)

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 2.6...3.2 1/min: 750 pressure

2nd speed

Supply-pump

bar: 3.6...4.2 1/min: 1000 pressure

3rd speed

Supply-pump bar: 4.6...5.2 pressure Overflow quantity at overflow valve: 1st speed 1st speed 1/min: 500 ind. : 41...83 Oveflow cm3/10s: (26...98) 2nd speed quantity 1/min: 1000 2nd speed : 55...138 Overflow quantity cm3/10s: (40...153) Delivery-quant. and breakaway char .: Cut-in 1/min: 1170 1st speed Del.quantity cm3/: 0,0...3,0 1000H.: -1/min: 1100 2nd speed Del.quantity cm5/: 2 cm3/: 25.0...45.0 1/min: 1045 3rd speed Del.quantity cm3/: ou.u....69.0) KF MS 1/min: 1000 SVS max. 4th speed cm3/: 69.5...72.5 1000H.: (69.0...75.0) 1/min: 900 Del.quantity FH XK XL 5th speed Del.quantity cm3/: 72.0...73.0 1000H.: (70.5...76.5) Remarks: 6th speed 1/min: 750 cm3/: 74.0...78.0 Del.quantity 1000H.: (72.0...80.0) 1/min: 500 7th speed Del.quantity cm3/: 58.5...66.5 1000H.: (56.5...68.5) Zero delivery (stop): Mech. shutoff: 1/min: 1000 Speed Del.quantity cm3/: 0..3 1000H .: -Electr. shutoff: 1/min: 500 Speed ELAB volt: -Del.quantity cm3/: 0.0...3.0 1000H .: max. Idle delivery: Mfg. date: until : -1st speed 1/min: 500 Del.quantity cm3/: 4.0...10.0 1000H.: (2.0...12.0) 1/min: 540 2nd speed Del.quantity cm3/: 0.0...3.0 1000H.: -

Automatic starting fuel delivery: 1/min: 130 Del.quantity cm3/: -1000H: 80,0 1/min: 250 Del.quantity cm3/: -1000H: 60 Shutoff electromagnet: : 10.0 min. voltage : 12.0 Rated voltage Mounting and assembly dimensions: Designation mm : 5.2 mn : 1.0 mm : 1.2 mm mm 18.8...20.8 mm mm : 9.9...13.3 Heavy-duty fuel-injection pump for DI-engines: only test using timingdevice-travel measuring device with metal jacket

Note inst. in remarks column

: CUM 5.9 W66 Test sheet : 22.06.90 Edition

replaces

Calibrating oil : ISO 4113

: VE 6/12F1100 R387-1 Injection pump

: 0 460 426 173 Type number

Customer-specific information

Customer : CUM

: 6BT-5.9 IND. Engine

TEST BENCH REQUIREMENTS

Calibrating-oil return temp. °C

with thermometer : 40...48 : 42...50 electronically

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 250...253 pressure

Perforated-plate

mm : 0.5diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm : 0.3

(from BDC): +-0.02(0.04)

Start of delivery block Piston stroke mm: 1.6

mm: +0.02(0.06)

Outlet : D

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 1000 Speed Charge press. hPa: 1000 Setting value mm: 1.8...2.2

Supply-pump pressure:

Speed 1/min: 1000 Charge press. hPa: 1000 Setting value bar: 7.4...8.0

Full-load del. with charge press.:

1/min: 900 Speed Charge press. hPa: 1000

Del.quantity cm3/ 1000H.: 67.5...68.5

cm3/:4.0Dispersion 1000H: (4.5)

Full-load del. w/out charge press.:

 $1/\min : 600$ Speed

Del.quantity cm3/

1000H.: 56.0...57.0

cm3/: 9.0 Dispersion 1000H.: (9.0)

Low-idle speed regulation:

1/min: 340 Speed

Del.quantity cm3/

1000H.: 10.0...12.0

cm3/: 5.5 Dispersion

1000H.: (7.0)

Full-load speed regulation:

1/min: 1170 Speed Charge press. hPa: 1000 Del.quantity cm3/ 1000H: 44.5...50.5

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 65.0 mind

Inspection pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 900 1st speed Charge press. hPa: 1000 TD travel

mm: 0.7...1.5 mm: (0.4...1.8)

1/min: 1000 2nd speed Charge press. hPa: 1000

mm: 1.8...2.2 mm: (1.3...2.7) TD travel

Srd speed 1/min: 1100	+	1000H.: (63.069.0)
Charge press. hPa: 1000 TD travel mm: 2.43.2	Ť	7th speed 1/min: 900
mn: (2.13.5)	T	Charge press. hPa: 1000
mi: (2.13.3)	T	Del.quantity cm3/: 67.568.5
Complete warm anagoran abancetonistics	T	1000H.: (65.071.0)
Supply-pump pressure characteristic:	Ť	100m.: (05.0/1.0/
A-t	+	8th speed 1/min: 750
1st speed 1/min: 600	†	Charge press. hPa: 1000
Charge press. hPa: 1000	+	Del.quantity cm3/: 69.073.0
Supply-pump	+	1000H: (67.075.0) 9th speed 1/min: 700
pressure bar: 5.76.3 2nd speed 1/min: 900	†	9th speed 1/min: (00
Zna speed 1/min: 900	+	Charge press. hPa: 400
Charge press. hPa: 1000	+	Del.quantity cm3/: 66.067.0
Supply-pump	+	1000H: (62.570.5)
pressure bar: 7.17.7	+	10th speed 1/min: 600
3rd speed 1/min: 1000	+	Del.quantity cm3/: 56.057.0
Charge press. hPa: 1000	+	1000H: (52.560.5)
Supply-pump	+	
pressure bar: 7.48.0	+	Zero delivery (stop):
4th speed 1/min: 1100	+	
Charge press. hPa: 1000	+	Mech. shutoff:
Supply-pump	+	
pressure bar: 7.98.5	+	Speed 1/min: 1100
	+	Del.quantity cm3/: 03
Overflow quantity at overflow valve:	+	1000H.: -
	+	
1st speed 1/min: 600	+	Electr. shutoff:
Oveflow : 4183	+	
quantity cm3/10s: (2698)	+	Speed 1/min: 340
2nd speed 1/min: 1100	+	ELAB volt: -
Charge press. hPa: 1000	+	Del.quantity cm3/: 0.03.0
Overflow : 55138	+	max. 1000H.: -
quantity cm3/10s: (40153)	+	
4	+	Idle delivery:
Delivery quant. and breakaway char.:	+	•
	+	1st speed 1/min: 340
1st speed 1/min: 700	+	Del.quantity cm3/: 1012.0
Charge-air pressure-setting	+	1000H.: (6.016.0)
point hPa: 400	+	2nd speed 1/min: 450
Del.quantity cm3/: 66.067.0	+	Del.quantity cm3/: 0.04.0
1000H.: (62.570.5)	+	1000H.: -
2nd speed 1/min: 1280	1	
Charge press. hPa: 1000	1	Automatic starting fuel delivery:
Del.quantity cm3/: 0.03.0	+	,
1000н.: -	1	1st speed 1/min: 350
3rd speed 1/min: 1230	1	Del.quantity cm3/: -
Charge press. hPa: 1000	+	ind. 1000H: 70.0
Del.quantity cm3/: 0.015.0	1	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
1000H.: -	+	2nd speed 1/min: 480
4th speed 1/min: 1200	1	Del.quantity cm3/: -
Charge press. hPa: 1000	1	max. 1000H: 70.0
Del.quantity cm3/: 15.055.0	1	
1000H.: -	1	Shutoff electromagnet:
5th speed 1/min: 1170	1	The second conditions
Charge press. hPa: 1000	1	Cut-in
Del.quantity cm3/: 44.550.5	1	min. voltage : 10.0
1000H.: (41.553.5)	I	Rated voltage : 12.0
6th speed 1/min: 1100	I	nated voltage . 12.0
Charge press. hPa: 1000	I	Mounting and assembly dimensions:
charge hiess. Illa. 1000	Ι	multiting and assembly dimensions.
	T	

# Designation

K mm : KF mm : 5.0...5.4
MS mm : 1.3...1.7
SVS max. mm : 1.0
XK mm : 21.8...23.8
XL mm : 10.2...13.6

### Remarks:

Operate control lever after each manifold—pressure compensator pressure change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

: CUM 5.9 W63 Test sheet Edition : 20.06.90

replaces

Calibrating oil : ISO 4113

: VE 6/12F1300 R377-1 Injection pump

: 0 460 426 174 Type number

Customer-specific information

Customer : CUM

: 68T 5.9 A Engine

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer : 40...48 : 42...50 electronically

Inlet press., bar: 0.35

Calibrating nozzle-holder

assembly : 1 688 901 027

Opening

bar: 250...253 pressure

Perforated plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm : 0.3

(from BDC): +-0.02(0.04)

Start of delivery block mm: 2.35 Piston stroke

mn: +-0.02(0.06)

Outlet : D

Injection pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 850 Speed Charge press. hPa: 1000 Setting value mm: 2.6...3.0

Supply-pump pressure:

Speed 1/min: 850 Charge press. hPa: 1000 Setting value bar: 6.6...7.2

Full-load del. with charge press.:

1/min: 850 Speed Charge press. hPa: 1000 Charge press.
Del.quantity cm3/
1000H.: 73.5...74.5

cm3/: 4.0Dispersion 1000H: (4.5)

Full-load del. w/out charge press.:

Speed  $1/\min : 500$ 

Del.quantity cm3/

1000H.: 50.5...51.5

cm3/: 9.0Dispersion 1000H.: (9.0)

Low-idle speed regulation:

1/min: 350 Speed

Del.quantity cm3/ 1000H.: 9.0...11.0

cm3/: 5.5 Dispersion

1000H.: (7.0)

Full-load speed regulation:

1/min: 1400 Speed Charge press. hPa: 1000 Del.quantity cm3/ 1000H: 54.0...60.0

Start:

1/min: 100 Speed cm3/1000H.: 60.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 700 1st speed Charge press. hPa: 1000

TD travel mm: 1.4...2.2 mm: (1.1...2.5) 1/min: 850

2nd speed

Charge press. hPa: 1000 TD travel mm: 2.6...3.0

mm: (2.1...3.5)

1/min: 1300 3rd speed

	1000 2.93.7 (2.64.0)	8th speed 1/min: 700 Charge press. hPa: 475 Del.quantity cm3/: 63.064.0
Supply-pump pressur	re characteristic:	1000H: (59.567.5) 9th speed 1/min: 500 Del.quantity cm3/: 50.551.5
1st speed 1/min: Charge press. hPa:	500 1000	1000H: (47.055.0)
	4.85.4	Zero delivery (stop):
2nd speed 1/min: Charge press. hPa: Supply-pump	1000	Mech. shutoff:  Speed 1/min: 1300
pressure bar: 3rd speed 1/min:	1300	Del.quantity cm3/: 03 1000H.: -
Charge press. hPa: Supply-pump pressure bar:	+	Electr. shutoff:
Overflow quantity a	+	Speed 1/min: 350 ELAB volt: -
1st speed 1/min:	+	Del.quantity cm3/: 0.03.0 max. 1000H.: -
Oveflow :	4183	
quantity cm3/10s: 2nd speed 1/min:	1300	Idle delivery:
Charge press. hPa: Overflow:	55138	1st speed
quantity cm3/10s: Delivery-quant. and	+	1000H.: (5.015.0) 2nd speed
1st speed 1/min:	+	1000H.: -
Charge air pressure point hPa:	-setting +	Automatic starting fuel delivery:
Del.quantity cm3/: 1000H.:	63.064.0 +	1st speed
2nd speed 1/min: Charge press. hPa:	1000	2nd speed
Del.quantity cm3/: 1000H.:	- +	
3rd speed 1/min: Charge press. hPa:	1000	Shutoff electromagnet:
Del.quantity cm3/: 1000H.:	15.055.0	Cut-in min. voltage : 10.0
4th speed 1/min: Charge press. hPa:	1000 +	Rated voltage : 12.0
Del.quantity cm3/: 1000H.:	(51.063.0) +	Mounting and assembly dimensions:
5th speed 1/min: Charge press. hPa:	1000 +	Designation K mm : -
	(63.569.5)	MS mm : 1.21.6 SVS max. mm : 2.2
6th speed 1/min: Charge press. hPa: Del.quantity cm3/:	1000	Remarks:
7th speed 1/min:	(67.574.5) 850	Operate control lever after each manifold pressure compensator pressure
Charge press. hPa: Del.quantity cm3/:		<pre>change.  * Correction at adjusting nut (46)</pre>

Note inst. in remarks column

Test sheet : CUM 5.9 W64 Edition : 20.06.90

replaces

: ISO 4113 Calibrating oil

: VE 6/12F1400 R377-2 Injection pump

: 0 460 426 175 Type number

Customer—specific information

Customer : CUM

: 6BT 5.9 A Engine

Power k: 107 1/mi: 2800 Speed

TEST BENCH REQUIREMENTS

Calibrating-oil return temp.

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

assembly : 1 688 901 027

Opening

pressure bar: 250...253

Perforated-plate

diameter mm: 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0

mm: 840.0 x Length

Start of delivery

mm: 0.3 Prestroke

(from BDC): +-0.02(0.04)

Start of delivery block mm: 2.35 Piston stroke

mm: +-0.02(0.06)

Outlet

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

Speed 1/min: 1000 Charge press. hPa: 1000 Setting value mm: 2.2...2.6

Supply-pump pressure:

1/min: 1000 Speed Charge press. hPa: 1000 Setting value bar: 7.1...7.7

Full-load del. with charge press.:

Speed 1/min: 850 Charge press. hPa: 1000

Del.quantity cm3/ 1000H.: 57.0...58.0

cm3/:4.0Dispersion 1000H: (4.5)

Full-load del. w/out charge press.:

Speed 1/min: 500

Del.quantity cm3/

1000H.: 44.5...45.5

cm3/: 9.0Dispersion 1000H.: (9.0)

Low-idle speed regulation:

1/min: 375

Deliquantity cm3/

1000H.: 6.5...10.5

cm3/: 5.5 Dispersion

1000H.: (7.0)

Full-load speed regulation:

1/min: 1520 Speed Charge press. hPa: 1000

Del.quantity cm3/ 1000H: 41.0...47.0

Start:

1/min: 100 Speed cm3/1000H.: 50.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 850 1st speed

Charge press. hPa: 1000 TD travel mm: 1.0...1.8 mm: (0.7...2.1)

2nd speed 1/min: 1000 Charge press. hPa: 1000

Th through the 2.2	Change mann hone 1500
TD travel mm: 2.22.6	+ Charge press. hPa: 1000
mm: (1.73.1)	Del.quantity cm3/: 57.058.0 1000H.: (54.560.5)
3rd speed 1/min: 1400	1000H.: (34.300.3)
Charge press. hPa: 1000	+ 8th speed 1/min: 700
TD travel mm: 2.93.7	+ Charge press. hPa: 300
mm: (2.64.0)	+ Del.quantity cm3/: 50.051.0
	1000H: (46.554.5)
Supply-pump pressure characteristic:	+ 9th speed 1/min: 500
4	Del.quantity cm3/: 44.545.5
1st speed 1/min: 500	1000H: (41.049.0)
Charge press. hPa: 1000	† ~
Supply-pump	† Zero delivery (stop):
pressure bar: 4.75.3	†
2nd speed 1/min: 1000	+ Mech. shutoff:
Charge press. hPa: 1000	<b>†</b>
Supply-pump	+ Speed 1/min: 1400
pressure bar: 7.17.7  3rd speed 1/min: 1400	+ Del.quantity_cm3/: 03
3rd speed 1/min: 1400	† 1000H.: -
Charge press. hPa: 1000	+ -, -, -, -, -, -, -, -, -, -, -, -, -,
Supply-pump	+ Electr. shutoff:
pressure bar: 8.99.5	<u> </u>
	+ Speed 1/min: 375
Overflow quantity at overflow valve:	+ ELAB VOLT: -
	- Del.quantity cm3/: 0.03.0
1st speed 1/min: 500	+ max. 1000H.: -
Oveflow : 4183	†
quantity cm3/10s: (2698)	† Idle delivery:
2nd speed 1/min: 1400	+
Charge press. hPa: 1000	+ 1st speed 1/min: 375
Overflow : 55138	+ Del.quantity cm3/: 6.510.5
quantity cm3/10s: (40153)	Del.quantity cm3/: 6.510.5 1000H.: (3.513.5)
	- 2nd speed 1/min: 450
Delivery-quant. and breakaway char.:	Del.quantity cm3/: 0.04.0 1000H.: -
	+ 1000H.: -
1st speed 1/min: 700	<del>-</del>
Charge-air pressure-setting	Automatic starting fuel delivery:
point hPa: 300	+
Del.quantity cm3/: 50.051.0	+ 1st speed 1/min: 230
1000H.: (46.554.5)	+ ind. 1000H: 65.0
2nd speed 1/min: 1680	+
Charge press. hPa: 1000	+ 2nd speed 1/min: 400
Del.quantity cm3/: 0.03.0	+ max. 1000H: 65.0
1000H.: -	+
3rd speed 1/min: 1590	+ Shutoff electromagnet:
Charge press. hPa: 1000	+
Del.quantity cm3/: 15.055.0	+ Cut-in
1000H.: -	+ min. voltage : 10.0
4th speed 1/min: 1520	+ Rated voltage : 12.0
Charge press. hPa: 1000	+
Del.quantity cm3/: 41.047.0	Mounting and assembly dimensions:
1000H.: (38.050.0)	+
5th speed 1/min: 1400	+ Designation
Charge press. hPa: 1000	+ K mm : -
Del.quantity cm3/: 57.561.5	+ MS mm : 1.01.4
1000H.: (56.062.0)	+ SVS max. mm : 2.2
6th speed 1/min: 1100	+
Charge press. hPa: 1000	+ Remarks:
Del.quantity cm3/: 58.061.0	+
1000H.: (56.063.0)	† Operate control lever after each
7th speed 1/min: 850	+ manifold-pressure compensator pressure
	· · · · · · · · · · · · · · · · · · ·

change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

: CUM 5.9 W65 Test sheet Edition : 20.06.90

replaces

Calibrating oil : ISO 4113

: VE 6/12F1400 R377-3 Injection pump : 0 460 426 176 Type number

Customer-specific information : CUM Customer

Engine : 68T 5.9 A

k: 114 Power 1/mi: 2800 Speed

TEST BENCH REQUIREMENTS

Calibrating-oil

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 027 assembly

Opening

bar: 0.35 pressure

Perforated-plate

mm:0.5diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

Prestroke mm: 0.3

(from BDC): +0.02(0.04)

Start of delivery block mm: 2.25 Piston stroke

mm: +-0.02(0.06)

Outlet

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 1000 Speed Charge press. hPa: 1000 Setting value mm: 1.8...2.2

Supply-pump pressure:

1/min: 1000 Speed Charge press. hPa: 1000 Setting value bar: 5.8...6.4

Full-load del. with charge press.:

1/min: 850 Speed Charge press. hPa: 1000

Del.quantity cm3/ 1000H.: 56.5...57.5

cm3/: 4.0Dispersion 1000H : (4.5)

Full-load del. w/out charge press.:

Speed  $1/\min : 500$ 

Del.quantity cm3/ 1000H.: 50.0...51.0

cm3/: 9.0Dispersion 1000H.: (9.0)

Low-idle speed regulation:

1/min: 375

Del.quantity cm3/ 1000H.: 5.0...9.0

cm3/: 5.5Dispersion 1000H.: (7.0)

Full-load speed regulation:

1/min: 1520 Speed Charge press. hPa: 1000 Del.quantity cm3/

1000H: 47.5...53.5

Start:

1/min: 100 cm3/1000H.: 55.0 Speed mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 850 1st speed Charge press. hPa: 1000

mm: 0.5...1.3 mm: (0.2...1.6) TD travel

2nd speed 1/min: 1000 Charge press. hPa: 1000

TD travel mm: 1.82.2 mm: (1.32.7)  3rd speed 1/min: 1400 Charge press. hPa: 1000 TD travel mm: 2.93.7 mm: (2.64.0)	Charge press. hPa: 1000 Del.quantity cm3/: 61.562.5 1000H.: (59.065.0) 8th speed 1/min: 700 Charge press. hPa: 350 Del.quantity cm3/: 56.557.5 1000H: (53.061.0)
Supply-pump pressure characteristic:	+ 9th speed 1/min: 500 + Del.quantity cm3/: 50.051.0
1st speed 1/min: 500 Charge press. hPa: 1000 Supply-pump	1000H: (46.554.5)  Zero delivery (stop):
pressure bar: 3.44.0 2nd speed 1/min: 1000	Mech. shutoff:
Charge press. hPa: 1000 Supply-pump pressure bar: 5.86.4	Speed 1/min: 1400
3rd speed 1/min: 1400 Charge press. hPa: 1000	Del.quantity cm3/: 03
Supply-pump pressure bar: 7.58.1	Electr. shutoff: Speed 1/min: 375
Overflow quantity at overflow valve:	ELAB volt: - Del.quantity cm3/: 0.03.0
1st speed 1/min: 500 Oveflow: 4183 quantity cm3/10s: (2698)	+ max. 1000H.:-  Idle delivery:
2nd speed 1/min: 1400 Charge press. hPa: 1000 Overflow : 55138	1st speed 1/min: 375
quantity cm3/10s: (40153)	Del.quantity cm3/: 5.09.0 1000H.: (2.012.0) 2nd speed 1/min: 450
Delivery-quant. and breakaway char.:  1st speed 1/min: 700	Del.quantity cm3/: 0.04.0 1000H.: -
Charge-air pressure-setting point hPa: 350	Automatic starting fuel delivery:
Del.quantity cm3/: 56.557.5 1000H.: (53.061.0) 2nd speed 1/min: 1700	1st speed 1/min: 270 ind. 1000H: 65.0
Charge press. hPa: 1000 Del.quantity cm3/: 0.03.0 1000H.: -	- 2nd speed 1/min: 400 - max. 1000H: 75.0
3rd speed 1/min: 1600 Charge press. hPa: 1000	Shutoff electromagnet:
Del.quantity cm3/: 15.055.0 1000H.: - 4th speed	+ Cut-in + min. voltage : 10.0 + Rated voltage : 12.0
Charge press. hPa: 1000 Del.quantity cm3/: 47.553.5 1000H.: (44.556.5)	Mounting and assembly dimensions:
5th speed 1/min: 1400 Charge press. hPa: 1000	Designation
Del.quantity cm3/: 60.063.0 1000H.: (58.564.5) 6th speed 1/min: 1100	+ MS mm : 0.61.0 + SVS max. mm : 2.0
Charge press. hPa: 1000 Del.quantity cm3/: 62.064.0 1000H.: (60.067.0)	Remarks: Operate control lever after each
7th speed 1/min: 850	manifold pressure compensator pressure

change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

: CUM 5.9 W56 Test sheet : 19.06.90 Edition : ISO 4113 Calibrating oil

: VE 6/12F1050 R372-1 Injection pump Type number : 0 460 426 178

Customer-specific information

Customer : CUM

: 6BT-5.9 IND. Engine

TEST BENCH REQUIREMENTS

Calibrating-oil

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 016 assembly

Opening

bar: 207...210 pressure

Perforated-plate

mm: 0.5 diameter

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm: 840.0 x Length

Start of delivery

\_mm : 0.3 Prestroke

(from BDC): +0.02(0.04)

Start of delivery block Piston stroke mm: 1.5

mm: +0.02(0.06)

Outlet. : D

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 750 Speed

Setting value mm: 2.4...2.8

Supply-pump pressure:

1/min: 750

Setting value bar: 2.9...3.5

Full-load del. w/out charge press.:

1/min: 900 Speed

Del.quantity cm3/

1000H.: 76.0...77.0

cm3/: 4.0 Dispersion

1000H.: (4.5)

Low-idle speed regulation:

1/min: 375

Del.quantity cm3/

1000H.: 27.0...33.0

 $cm3/: \bar{3.5}$ Dispersion

1000H.: (4.5)

Full-load speed regulation:

1/min: 1150 Speed

Del.quantity cm3/

1000H: 26.0...34.0

Start:

1/min: 100 Speed cm3/1000H.: 110.0 mind

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 600 1st speed

mm: 0.9...1.7 TD travel

mm: (0.6...2.0)

1/min: 750 2nd speed

mm: 2.4...2.8 mm: (1.9...2.3) TD travel

1/min: 900 3rd speed

mm: 3.5...4.3 TD travel

mm: (3.2...4.6)

Supply-pump pressure characteristic:

1/min: 500 1st speed

Supply-pump

bar: 1.9...2.5 pressure

1/min: 750 2nd speed

amua-y-Jaque

bar: 2.9...3.5 pressure

3rd speed 1/min: 900

Supply-pump

bar: 3.5...4.1 pressure

# Overflow quantity at overflow valve:

1st speed 1/min: 500 Oveflow : 41...83 quantity cm3/10s: (26...98) 2nd speed 1/min: 1050 Overflow : 55...138 quantity cm3/10s: (40...153)

# Delivery-quant. and breakaway char.:

# Zero delivery (stop):

#### Mech. shutoff:

Speed 1/min: 1050 Del.quantity cm3/: 0..3 1000H.: -

### Electr. shutoff:

Speed 1/min: 375
ELAB volt: Del.quantity cm3/: 0.0...3.0
max. 1000H.: -

#### Idle delivery:

# Automatic starting fuel delivery:

1st speed 1/min: 130 ind. 1000H: 110.0

2nd speed 1/min: 200 max. 1000H: 105.0

# Shutoff electromagnet:

Cut-in

min. voltage : 10.0 Rated voltage : 12.0

# Mounting and assembly dimensions:

Designation

K mm : KF mm : 5.0...5.4
MS mm : 1.3...1.7
XK mm : 18.8...20.8
XL mm : 11.1...14.5

#### Remarks:

Note inst. in remarks column

Test sheet : OPE 1.5 C Edition : 22.06.90

replaces

Calibrating oil : ISO 4113

: VE 4/ 9F2500 R305 Injection pump

Type number : 9 460 620 002 Customer Part-No. : 8 944 60 8050

Customer-specific information

: OPE Customer

Engine : 4EC1-AADT

TEST BENCH REQUIREMENTS

Calibrating oil return temp.

with thermometer: 40...48 : 42...52 electronically

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 022 assembly

Opening

bar: 130...133 pressure

Perforated-plate

diameter mm: 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 x Length mm : 450.0

Start of delivery Prestroke (from BDC): -

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

Speed 1/min: 1250 Charge press. hPa: 700

Setting value mm: 2.8...3.2

Supply-pump pressure:

Speed 1/min: 1250 Charge press. hPa: 700 Setting value bar: 3.8...4.4

Full-load del. with charge press.:

Speed 1/min: 1500 Charge press. hPa: 700

Del.quantity cm3/ 1000H.: 43.6...44.6

Dispersion cm3/:-

1000H: (2.5)

Full-load del. w/out charge press.:

 $1/\min : 600$ 

Del.quantity cm3/

1000H.: 33.0...37.0

Low-idle speed regulation:

1/min: 425 Speed

Del.quantity cm3/ 1000H.: 6.9...10.9

cm3/: 2.5Dispersion 1000H .: (3.0)

Full-load speed regulation:

1/min: 2750 Speed Charge press. hPa: 700

Del.quantity cm3/ 1000H: 16.9...22.9

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 44.0 mind

Load-dependent start of delivery:

1/min: 1250 Speed Charge press. hPa: 700

Inspection pump test specifications Test specifications in parentheses

Timing-device characteristic:

1st speed 1/min: 620 Charge press. hPa: 700

TD travel mm: 0.3...1.1mm: (0.0...1.4)

1/min: 1250 2nd speed

Charge press. hPa: 700

mm: 2.8...3.2 TD travel mm: (2.3...3.7)

3rd speed 1/min: 2000

Charge press. hPa: 700 TD travel mm: 5.66.4 mm: (5.36.7) 4th speed 1/min: 2250 Charge press. hPa: 700 TD travel mm: 6.67.4 mm: (6.37.7) Supply-pump pressure characteristic:	7th speed 1/min: 2000 Charge press. hPa: 700 Del.quantity cm3/: 40.543.5 1000H.: (40.044.0) 8th speed 1/min: 1500 Charge press. hPa: 700 Del.quantity cm3/: 43.644.6 1000H: (41.846.4) 9th speed 1/min: 1500 Del.quantity cm3/: 30.434.4
1st speed 1/min: 620 Charge press. hPa: 700 Supply-pump pressure bar: 2.22.8 2nd speed 1/min: 1250 Charge press. hPa: 700 Supply-pump pressure bar: 3.84.4 3rd speed 1/min: 2250 Charge press. hPa: 700 Supply-pump pressure bar: 6.26.8	10th speed 1/min: 1300 Charge press. hPa: 700 Del.quantity cm3/: 44.147.1 1000H: (43.647.6) 11th speed 1/min: 1000 Charge press. hPa: 340 Del.quantity cm3/: 39.840.8 1000H: (37.842.8) 1st speed 1/min: 600 Del.quantity cm3/: 33.037.0 1000H: (32.038.0)
Overflow quantity at overflow valve:	Zero delivery (stop):
1st speed 1/min: 600 Oveflow: 4183 quantity cm3/10s: (2698) 2nd speed 1/min: 2500 Charge press. hPa: 700 Overflow: 55138 quantity cm3/10s: (40153)	Electr. shutoff:  Speed 1/min: 425 ELAB volt: - Del.quantity cm3/: 0.03.0 max. 1000H.: -
Delivery-quant. and breakaway char.:	Idle delivery:
1st speed 1/min: 1000 Charge air pressure setting point hPa: 340 Del.quantity cm3/: 39.840.8 1000H.: (37.842.8) 2nd speed 1/min: 2750 Charge press. hPa: 700 Del.quantity cm3/: 16.922.9 1000H.: (15.923.9) 3rd speed 1/min: 2750 Charge press. hPa: 700 Del.quantity cm3/: 0.03.0 1000H.: - 4th speed 1/min: 2600 Charge press. hPa: 700 Del.quantity cm3/: 26.134.1 1000H.: - 5th speed 1/min: 2500 Charge press. hPa: 700 Del.quantity cm3/: 37.040.0 1000H.: (36.240.8) 6th speed 1/min: 2300	1st speed 1/min: 425 Del.quantity cm3/: 6.910.9 1000H.: (4.912.9) 2nd speed 1/min: 550 Del.quantity cm3/: 0.03.0 1000H.: -  Automatic starting fuel delivery:  1st speed 1/min: 100 Del.quantity cm3/: - ind. 1000H: 44.0  2nd speed 1/min: 400 Del.quantity cm3/: - max. 1000H: 42.5  Shutoff electromagnet:  Cut-in min. voltage : 10.0 Rated voltage : 12.0
Charge press. hPa: 700 Del.quantity cm3/: 40.443.4 1000H.: (39.744.1)	Mounting and assembly dimensions:

Designation K KF m mm MS mm SVS max. mm

# Remarks:

Operate control lever after each manifold-pressure compensator pressure change.

\* Correction at adjusting nut (46)

Note inst. in remarks column

: OPE 1.5 D Test sheet Edition : 22.06.90

replaces

: ISO 4113 Calibrating oil

: VE 4/ 9F2500 R341 Injection pump : 9 460 620 003 Type number

Customer Part-No.: 8 943 32 9740

Customer-specific information

: OPE Customer

Engine : 4EC1-BADT

TEST BENCH REQUIREMENTS

Calibrating-oil

with thermometer: 40...48 electronically : 42...50

Inlet press., bar: 0.35

Calibrating nozzle-holder

: 1 688 901 022 assembly

Opening

bar: 130...133 pressure

Perforated plate

diameter mm : 0.5

Test inj. tubing : 1 680 750 017

Outside diameter : 6.0 x Wall thickness : 2.0 mm : 450.0x Length

Start of delivery Prestroke mm: -(from BDC): -

Injection-pump setting values Test specifications in parentheses

Timing-device travel:

1/min: 1250 Speed Charge press. hPa: 700

Setting value mm: 2.8...3.2

Supply-pump pressure:

1/min: 1250 Speed

Charge press. hPa: 700 Setting value bar: 3.8...4.4

Full-load del. with charge press.:

1/min: 1500 Speed Charge press. hPa: 700

Del.quantity cm3/ 1000H.: 46.9...47.9

cm3/:-Dispersion

1000H: (2.5)

Full-load del. w/out charge press.:

 $1/\min : 600$ 

Del.quantity cm3/

1000H.: 33.8...37.8

Low-idle speed regulation:

1/min: 425 Speed

Del.quantity cm3/

1000H.: 6.9...10.9

cm3/: 2.5Dispersion 1000H.: (3.0)

Full-load speed regulation:

Speed 1/min: 2750 Charge press. hPa: 700

Del.quantity cm3/

1000H: 19.6...25.6

Start:

1/min: 100 Speed Del.quantity cm3/1000H.: 38.0 mind i

Load-dependent start of delivery:

Speed 1/min: 1250 Charge press. hPa: 700

Inspection-pump test specifications Test specifications in parentheses

Timing-device characteristic:

1/min: 620 1st speed Charge press. hPa: 700

mm: 0.3...1.1 TD travel mm: (0.0...1.4)

1/min: 1250 2nd speed

Charge press. hPa: 700 TD travel

mm: 2.8...3.2 mm: (2.3...3.7) 1/min: 2000

3rd speed

Charge press. hPa: 700 TD travel mm: 5.6	<u> </u>	7th	speed ge press	1/min:	2000
mm: (5.)	36.7)	Del.	quantity	cm3/:	44.347.3
4th speed 1/min: 225				1000H.:	(43.847.8)
Charge press. hPa: 700	' <b>-</b> ,		speed	1/min:	7500
TD travel mm: 6.6	37.7)	Unar Nel	ge press	cm3/	46.947.9
mii. Co.	J	vec.	qualitity	1000H:	(45.149.7)
Supply-pump pressure ch	aracteristic: +	9th	speed	1/min:	1500
	+	Del.	quantity	cm3/:	34.638.6
1st speed 1/min: 620	†	104			(34.139.1)
Charge press. hPa: 700 Supply-pump	Ĭ	Char	speed ge press	hPa:	700
pressure bar: 2.2	2.8	Del.	auantity	cm3/:	46.149.1
pressure bar: 2.2 2nd speed 1/min: 1250	0 +			1000H:	(45.649.6)
Charge press. hPa: 700	+		speed		
Supply-pump	. , ,	unar	ge press	. hPa:	34U 13 7 11 5
pressure bar: 3.8 3rd speed 1/min: 2250	ό·· <sup>4·4</sup> Ι	vec.	quantity	1000H:	43.344.5
Charge press. hPa: 700	1	1st	speed	1/min:	(41.346.5) 600
Supply-pump	+	Del.	quantity	cm3/:	33.837.8
pressure bar: 6.2	6.8		•	1000H.:	(32.838.8)
Overflow quantity at over	erflow valve:	Zero	deliver	y (stop)	:
1st speed 1/min: 600	1				
Oveflow : 41.	83	Elec	tr. shuto	off:	
quantity cm3/10s: (26	98)				
2nd speed 1/min: 2500	0 +		ed .		
Charge press. hPa: 700	470	ELAB		volt:	
Overflow : 55. quantity cm3/10s: (40			quantity	: \cms : .1000H	0.03.0
quality cho. (40)	1	191 10.	,		
Delivery—quant. and brea	akaway char.:	Idle	delivery	<b>/:</b>	
1st speed 1/min: 1000	D +	1st	speed	1/min:	425
Charge-air pressure-set		Del.	quantity	cm3/:	6.910.9 (4.912.9)
point hPa: 340	7 // 7			1000H.:	(4.912.9)
Del.quantity cm3/: 43.3 1000H.: (41.	3···44·3	Znu Del	speed	1/min:	0.05.0
2nd speed 1/min: 2950	Ď +		quality	1000H.:	-
Charge press. hPa: 700	+				
Deliquantity cm3/: 0.0.	15.0	Auto	matic sta	arting 1	uel delivery:
1000H.: - 3rd speed	$_{n}$ . $^{\prime}$	1et	speed	1/min:	100
Charge press. hPa: 700	7		quantity	cm3/:	-
Charge press. hPa: 700 Del.quantity cm3/: 19.6	525.6	ind		1000H:	38.0
1000H.: (18.	.626.6)	<b>~</b> .			400
4th speed 1/min: 2600				1/min:	
Charge press. hPa: 700 Del.quantity cm3/: 26.1	1 34.1 I	max.	quantity 1	: H0001	57.5
1000н.: -	+				
5th speed     1/min: 2500 Charge press.   hPa: 700		Snut	off elect	romagne	t:
Deliquantity cm3/: 34.1	137.1 I	Cut-	in		
1000H.: (33.	.337.9)		. voltage	:	10.0
6th speed 1/min: 2300			d voltage		12.0
Charge press. hPa: 700	· /7 · +	Marina	+ 1 00 m = 1 m = 1	2222261	v dimonaia
Deliquantity cm3/: 44.5		MOUN	ting and	asseniol	y dimensions:

Designation K KF MS m nan. mm SVS max. m

# Remarks:

Operate control lever after each manifold-pressure compensator pressure change.

\* Correction at adjusting nut (46)

Note remarks

Test sheet : KHD 3,0 b 2 : 02.05.90 Edition : 15.8.89 Replaces : ISO-4113 Test oil

Combination no. : 0 400 473 088

Injection pump

Pump designation : PES3A80D410RS1324-2

: 0 410 483 025 EP type number

Governor

: RSV325...900A7c602-1 Governor design.

: 0 420 232 388 Governer no.

Customer-spec. information Customer : KHD

: F3L912 Engine

: 60.0 1st version kW : 1800 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening 1

pressure, bar : 172...175

Test lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 1,90...2.00 Prestroke mm

: (1.85...2.05)

Rack travel in mm : 9.00...12.00

Firing order : 1- 3- 2

: 0-120-240 Phasing

Tolerance  $+ - \circ : 0.50 (0.75)$ 

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 880

Rack travel in mm : 11.60...11.70

Del.quantity cm3/ : 4.6...4.7

100 s: (4.5...4.9)

cm3 : 0.2Spread

100 s: (0.4)

rpm : 325.02nd speed Rack travel in mm: 8.9...9.1 Del.quantity cm3/: 0.7...1.3

100 s: (0.5...1.4) Spread

cm3 : 0.2 100 s: (0.3)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800 Rack travel in mm: 0.30...0.70

Governor spring pre-tension Click setting x : 5.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 880

: 46.5...47.5 Del.quantity 1000 : (45.0...49.0)

: 2.50 Spread cm3

1000 : (4.00)

RATED SPEED

1st version

Control lever

position degrees: 100...108

Testing:

1st rack travel in: 10.60 rpm : 920...930 Speed

2nd rack travel in: 4.00

rpm : 935...965 Speed 3rd rack travel in: 4.00 rpm : 955...985 Speed 4th rack travel in: 1145 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 68...76 Setting point w/out bumper spring rpm : 325 Rack travel in mm: 6.5 Testing: Speed rpm : 100 Minimum rack trave: 19.50 rpm : 325 Rack travel in mm : 6.90...7.10 Rack travel in mm : 2.00 Speed rpm : 475...535 TORQUE CONTROL Torque control curve - 1st version rpm : 880 1st speed Rack travel in m: 11.60...11.70 nd speed rpm : 500 Rack travel in m: 13.00...13.10 2nd speed 3rd speed rpm : 700 Rack travel in m: 12.20...12.30 FUEL DELIVERY CHARACTERISTICS 1st version : 700 Speed rpm Del.quantity cm3/: 49.5...51.5 1000 s: (47.5...53.5) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 10.60 rpm : 920...930 Speed STARTING FUEL DELIVERY Speed : 100 rpm Del.quantity cm3/: 115.0...125.0 1000 s: (112.0...128.0) Rack travel in mm : 19.50...21.00 Remarks:

Generator set

APPLICATION

Note remarks

: KHD 19,0 n4 : 06.07.90 Test sheet Edition

Replaces

Test oil : ISO-4113

Combination no. : 0 400 640 115

Injection pump

Pump designation : PE12A95D610LS2590 EP type number : 0 410 690 995

Governor

Governor design. : RQV300...1000AB1047-

: 0 420 212 223 Governer no.

Customer-spec. information : KHD Customer

Engine : F12L413FW

: 182.0 1st version kW Rated speed : 2000

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

pressure, bar : 172...175

: 1 680 750 014 Test lines

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 1.50...1.60 Prestroke mm

: (1,45...1.65)

Rack travel in mm : 9.00...12.00

: 1- 4- 9- 8- 5- 2-Firing order

11-10-3-6-7-12

: 0-15-60-75-120-135-Phasing

180-195-240-255-300-

315

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1000

Rack travel in mm : 10.00...10.10

Del.quantity cm3/: 7.9...8.1

100 s: (7.7...8.3)

Spread cm3 : 0.3

100 s: (0.6)

rpm : 300.0 2nd speed cm3/: 1.0...1.6Del.quantity

100 s: (0.7...1.8)

cm3 : 0.3Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 300 1st speed

1.20...1.30 travel mm 2nd speed : 340

rpm : 1.80...1.90 travel mm

3rd speed : 390 rpm

: 2.40...2.50 travel mm

4th speed : 1050 rpm

8.70...8.90 travel mm

1110 5th speed rpm

: 9.50...9.70 travel mm

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

Speed rpm : 1015 Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1000 Speed

: 79.0...81.0 Del.quantity

1000 : (77.0...83.0)

cm3 : 3.50Spread 1000 : (6.00)

RATED SPEED

1st version Control lever

position degrees: 116...124

Testina:

1st rack travel in: 9.00

Speed rpm : 1040...1050 2nd rack travel in: 4.00

rom : 1085...1115 Speed

LOW IDLE 1

Control Lever

position degrees: 82...90

Testina:

Speed : 200 rpm Minimum rack trave: 9.00 rpm : 300 Speed

Rack travel in mm : 5.90...6.10

CONSTANT REGULATION

rpm : 300...450 Speed

TORQUE CONTROL

Dimension a mm : 0.40

Torque control curve - 1st version

1st speed rpm : 1000

Rack travel in m: 10.00...10.10

2nd speed rpm : 800

Rack travel in m: 10.40...10.50

3rd speed rpm : 900

Rack travel in m: 10.20...10.40

START CUT-OUT

1/min: 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Speed : 100 rpm

Del.quantity cm3/: 65.0...70.0 1000 s: (62.5...72.5)

rpm : 800Speed

Del.quantity cm3/: 82.5...85.5

1000 s: (80.0...88.0)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 9.00

F03

rpm : 1040...1050 Speed

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 120.0...130.0 1000 s: (117.0...133.0)

Remarks:

Check electrically unlatched starting fuel delivery (EES) with 24 volt.

On activation of the starting solenoid, the start position must be reached.

2. Set fuel delivery in fuel-delivery characteristics with stop above the governor housing.

When accelerating from engine speed "O", no voltage in starting solenoid.

**APPLICATION** 

Below-ground operation

Note remarks

Test sheet : MB 8,7 c 1 : 20.07.90 Edition Replaces : 7.85

Test oil : ISO-4113

: 0 400 646 248 Combination no.

Injection pump

Pump designation : PE6A90D410RS2124X

EP type number : 0 410 696 155

Governor

: RQ375/1275AB658DL Governor design.

: 0 420 202 282 Governer no.

Customer-spec. information

: MERCEDES-BENZ Customer

: 0M 360 Engine

: 125.0 1st version kW Rated speed : 2550

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina

: 172...175 pressure, bar

Test Lines : 1 680 750 014

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.15...2.25 Prestroke mm

: (2.10...2.30)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 1250 1st speed

Rack travel in mm : 9.30...9.40

Del.guantity cm3/: 7.7...7.8

100 s: (7.5...8.0)

cm3 : 0.3Spread

100 s: (0.4)

2nd speed rpm : 375.0 Rack travel in mm : 5.9...6.1 Del.quantity cm3/ : 1.0...1.6

100 s: (0.8...1.8)

cm3 : 0.2Spread 100 s: (0.4)

GUIDE SLEEVE POSITION Control-Lever position

Degree: -1

rpm : 700 Speed

Rack travel in mm : 15.60...16.40

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1250

Del.quantity : 77.0...78.0 1000 : (75.0...80.0)

: 3.00 Spread Cm3

1000 : (4.50)

RATED SPEED

1st version

Setting point:

: 700 Speed rpm Rack travel in mm: 16.0

Testing:

1st rack travel in: 8.30

rpm : 1295...1310 Speed

2nd rack travel in: 4.00

rpm : 1345...1375 Speed

LOW IDLE 1 Setting point w/out bumper spring rpm : 375 Rack travel in mm: 6.0 Testing: Speed rpm : 100 Minimum rack trave: 7.50 Speed rpm Rack travel in mm : 5.90...6.10 Rack travel in mm : 2.00 Speed : 420...460 rpm : 500 Speed rpm Maximum rack trave: 1.00 TORQUE CONTROL Torque control curve - 1st version rpm : 1250 1st speed Rack travel in m: 9.30...9.40 2nd speed rpm : 700 Rack travel in m: 10.10...10.20 3rd speed rpm : 895 Rack travel in m: 9.80...10.00 4th speed rpm : 1075 Rack travel in m: 9.40...9.70 FUEL DELIVERY CHARACTERISTICS 1st version

1st version Speed rpm : 700 Del.quantity cm3/ : 77.0...80.0 1000 s: (75.0...82.0)

### RACK STOP ADJUSTMENT

Speed rpm: 650

### **BREAKAWAY**

1st version 1mm rack travel less than

full load rack tr: 8.30 Speed rpm : 1295...1310

#### STARTING FUEL DELIVERY

Speed rpm : 100 Rack travel in mm : 15.20...17.80

Remarks:

F05

#### Note remarks

Test sheet : KHD 9,6 n 1 : 06.07.90 : 5.2.88 Edition Replaces Test oil : ISO-4113

: 0 400 646 266 Combination no.

Injection pump

Pump designation : PE6A95D410LS2587 EP type number : 0 410 696 983

Governor

: RQV300...1150AB1088L Governor design.

Governer no. : 0 420 212 115

Customer-spec. information Customer : KHD

: F6L413 FW Engine

1st version kW : 102.0 : 2300 Rated speed

# TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 1.50...1.60 Prestroke mm : (1.45...1.65) Rack travel in mm : 9.00...12.00

: 1-6-5-4-3-2 Firing order

: 0-75-120-195-240-315 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

# BASIC SETTING

1st speed rom: 1150

Rack travel in mm : 9.60...9.70

Del.guantity cm3/: 7.8...8.0

100 s: (7.6...8.2)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.02nd speed Rack travel in mm: 6.4...6.6 Del.quantity cm3/: 0.9...1.5 100 s: (0.6...1.7)

cm3 : 0.3Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 300 1st speed 1.10...1.60 travel mm 390 2nd speed rpm : 2.20...2.60 travel mm : 1195 3rd speed rpm : 8.70...9.10 travel mm 4th speed : 1245 rpm

: 9.40...9.80 travel mm

GUIDE SLEEVE POSITION

Control-lever position Degree: -1

rpm : 1170 Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1150 Speed

: 78.0...80.0 Del.quantity 1000 : (76.0...82.0)

: 3.50 cm3 Spread

: (6.00) 1000

RATED SPEED

1st version Control lever

position degrees: 117...125

Testing:

1st rack travel in: 8.60

rpm : 1190...1200 Speed

2nd rack travel in: 4.00

rpm : 1230...1260 Speed

4th rack travel in: 1350

rpm : 0.00...1.00 Speed

LOW IDLE 1 Control Lever

position degrees: 67...75

Testing:

Speed rpm : 200 Minimum rack trave: 8.40 rpm : 300

Rack travel in mm : 6.40...6.60

CONSTANT REGULATION

rpm : 300...420 Speed

TORQUE CONTROL

Dimension a mm : 0.70

Torque control curve - 1st version

rpm : 1150 1st speed

Rack travel in m: 9.60...9.70

2nd speed : 500 rpm

Rack travel in m: 10.30...10.50

3rd speed rpm : 925

Rack travel in m: 10.10...10.30

4th speed rpm : 1030

Rack travel in m: 9.60...9.80

START CUT-OUT

1/min: 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

rpm : 100 Speed

Del.quantity cm3/: 65.0...70.0

1000 s: (62.5...72.5)

rpm : 800 Speed

Del.quantity cm3/: 80.5...83.5 1000 s: (78.0...86.0)

RACK STOP ADJUSTMENT

Speed : 500 rpm

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 8.60

rpm : 1190...1200 Speed

STARTING FUEL DELIVERY

: 100 Speed rom

Del.quantity cm3/: 120.0...130.0

1000 s: (117.0...133.0)

Rack travel in mm : 15.40...15.80

Remarks:

Check electrically unlatched starting fuel delivery (EES) with 24 volt.

On activation of the starting solenoid, the start position must be reached.

2. Set fuel delivery in fuel-delivery characteristics with stop above the governor housing.

When accelerating from engine speed "O", no voltage in starting solenoid.

**APPLICATION** 

Below-ground operation

Note remarks

Test sheet : DAF 8,3 k 2
Edition : 21.05.90
Replaces : 15.12.89
Test oil : ISO-4113

Combination no. : 0 400 646 268

Injection pump

Pump designation : PE6A95D41ORS2525 EP type number : 0 410 696 987

Governor

Governor design. : R9225/1200AB1156L

Governer no. : 0 420 200 079

Customer spec. information Customer : DAF

Engine : DH 825

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Opening

pressure, bar : 172...175

Test lines : 1 680 750 015

Outside diameter x Wall thickness

x Length mm : 6.00X1.50X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 2.00...2.10

: (1.95...2.15)

Rack travel in mm : 7.50...10.50

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50 & maximum rack tra: 21.00 Difference ° CS : 3.00...4.00

BASIC SETTING

1st speed rpm: 1200

Rack travel in mm : 10.40...10.50

Del.quantity cm3/ : 7.3...7.4

100 s: (7.1...7.6)

Spread cm3:0.3

100 s: (0.6)

2nd speed rpm : 225.0 Rack travel in mm : 5.9...6.1 Del.quantity cm3/ : 0.7...1.1 100 s: (0.4...1.3)

Spread cm3: 0.3

100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -2

Speed rpm : 650 Rack travel in mm : 19.20...20.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm: 1200

Del.quantity : 73.5...74.5 1000 : (71.5...76.5)

Spread cm3 : 3.50

1000 : (6.00)

RATED SPEED

1st version

Setting point:

Speed rpm : 650 Rack travel in mm : 20.0

Testina:

1st rack travel in: 9.40

Speed rpm : 1245...1260

2nd rack travel in: 4.00 Speed rpm : 1300...1330 4th rack travel in: 1400 rpm : 0.00...1.00Speed LOW IDLE 1 Setting point w/out bumper spring rpm : 225 Speed Rack travel in mm: 6.0 Testina: Speed : 100 rpm Minimum rack trave: 7.50 : 225 rpm Rack travel in mm : 5.90...6.10 Rack travel in mm: 2.00 rpm : 345...385 Speed Speed rpm : 490 Maximum rack trave: 1.00 TORQUE CONTROL Dimension a mm : 0.50Torque control curve - 1st version rpm : 1200 1st speed Rack travel in m: 10.40...10.50 rpm : 650 2nd speed Rack travel in m: 11.70...11.80 rpm : 1035 4th speed Rack travel in m: 10.90...11.10 5th speed rpm : 1100 Rack travel in m: 10.50...10.80 FUEL DELIVERY CHARACTERISTICS 1st version : 800 Speed rpm Del.quantity cm3/: 74.5...77.5 1000 s: (72.0...80.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 9.40 rpm : 1245...1260 Speed STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 130.0...140.0 1000 s: (127.0...143.0) Rack travel in mm: 19.50...21.00 Remarks: :

Note remarks

: KHD 12,7 p5 Test sheet Edition : 17.05.90 Replaces : 28.4.89 Test oil : ISO-4113

Combination no. : 0 400 648 111

Injection pump

Pump designation : PE8A95D410LS2608 EP type number : 0 410 698 988

Governor

Governor design: : RQ300/1250AB987DL : 0 420 202 277 Governer no.

Customer-spec. information : KHD Customer

: F8L413F Engine

1st version kW : 188.0 : 2500 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

**Opening** 

pressure, bar : 172...175

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.00...2.10 Prestroke mm : (1.95...2.15)

Rack travel in mm : 9.00...12.00

: 1- 8- 7- 2- 6- 5-4- 3 Firina order

: 0-45-90-135-180-225-Phasing

270-315

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 1250 1st speed

Rack travel in mm : 10.40...10.50

Del.quantity cm3/: 9.6...9.8

100 s: (9.4...10.0)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.02nd speed Rack travel in mm: 6.5...6.7 Del.quantity cm3/: 0.9...1.5

100 s: (0.6...1.7)

cm3 : 0.5Spread 100 s: (0.7)

GUIDE SLEEVE POSITION Control-lever position

Degree: -1 rpm : 550

Speed Rack travel in mm : 15.60...16.40

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1250 Speed

: 96.5...98.5 Del.quantity 1000 : (94.5...100.5)

: 3.50 Spread cm3

1000 : (6.00)

RATED SPEED

1st version

Setting point:

Speed rpm Rack travel in mm: 16.0

Testing:

1st rack travel in: 9.40

rpm : 1295...1310 Speed

2nd rack travel in: 4.00

rpm : 1335...1365 Speed

4th rack travel in: 1450 rpm : 0.00...1.00 Speed LOW IDLE 1 Setting point w/out bumper spring rpm : 300 Rack travel in mm: 6.0 Testina: Speed rpm : 100 Minimum rack trave: 7.50 rpm : 300 Rack travel in mm : 5.90...6.10 Rack travel in mm : 2.00 rpm : 345...385 Speed : 550 Speed rpm Maximum rack trave: 1.00 TORQUE CONTROL Dimension a mm : 0.25 Torque control curve - 1st version rpm : 1250 1st speed Rack travel in m: 10.40...10.50 2nd speed rpm : 550 Rack travel in m: 10.90...11.00 3rd speed rpm : 850 Rack travel in m: 10.60...10.80 4th speed rpm : 970 Rack travel in m: 10.40...10.60 FUEL DELIVERY CHARACTERISTICS 1st version rpm : 650 Speed Del.quantity cm3/: 95.0...98.0 1000 s: (92.5...100.5) RACK STOP ADJUSTMENT Speed rpm : 600 **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 9.40 rpm : 1295...1310 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 125.0...140.0

1000 s: (122.0...143.0) Rack travel in mm: 19.50...21.00

Remarks:

:

F11

LOW IDLE

Note remarks

Test sheet Edition : KHD 12,7 p7 : 11.05.89

Replaces

: ISO-4113 Test oi!

Combination no. : 0 400 648 112

Injection pump

Pump designation : PE8A95D410LS2608 EP type number : 0 410 698 988

Governor

Governor design. : RQV300...1250AB990DL

Governer no. : 0 420 214 228

Customer-spec. information Customer : KHD

Engine : F8L413F

1st version kW : 188.0 : 2500 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

pressure, bar : 172...175

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.00...2.10 Prestroke mm

: (1.95...2.15)

Rack travel in mm : 9.00...12.00

: 1- 8- 7- 2- 6- 5-4- 3 Firing order

: 0-45-90-135-180-225-Phasing

270-315

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 1250 1st speed

Rack travel in mm : 9.90...10.00

Del.quantity cm3/: 9.1...9.3

100 s: (8.9...9.5)

Spread cm3 : 0.3

100 s: (0.6)

2nd speed rpm : 300.0Rack travel in mm : 6.2...6.3 Del.quantity cm3/ : 1.1...1.7 100 s: (0.8...1.9)

cm3 : 0.3Spread

100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -1 rpm : 1290 Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1250

: 91.5...93.5 Del.quantity 1000 : (89.5...95.5) cm3 : 3.00

Spread

1000 : (6.00)

RATED SPEED

1st version

Control lever

position degrees: 57...65

Setting point:

: 1290 rpm Rack travel in mm : 16.5

Testina:

1st rack travel in: 8.90

Speed rpm : 1290...1300

2nd rack travel in: 4.00 rpm : 1360...1390 Speed 4th rack travel in: 1500 rpm : 0.00...1.00 Speed LOW IDLE 1 Control lever position degrees: 8...16 Setting point w/out bumper spring rpm : 300 Rack travel in mm: 6.2 Testina: Speed rpm : 100 Minimum rack trave: 7.70 Speed rpm : 300 Rack travel in mm : 6.20...6.30 : 950 Speed rpm Maximum rack trave: 1.00 CONSTANT REGULATION rpm : 320...440 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1250 Rack travel in m: 9.90...10.00 nd speed rpm : 1075 2nd speed Rack travel in m: 9.90...10.20 3rd speed rpm : 925 Rack travel in m: 10.20...10.40 4th speed rpm : 500 Rack travel in m: 10.40...10.50 START CUT-OUT 1/min: 220 (240) Speed FUEL DELIVERY CHARACTERISTICS 1st version Speed rpm : 1000 Del.quantity cm3/: 91.0...94.0 1000 s: (89.0...96.0) Speed rpm : 700 Del.quantity cm3/: 91.5...94.5 1000 s: (89.5...96.5) RACK STOP ADJUSTMENT rpm : 600 Speed **BREAKAWAY** 1st version 1mm rack travel less than

Speed rpm : 1290...1300

STARTING FUEL DELIVERY

Speed rpm : 100
Rack travel in mm : 13.90...14.90

Remarks:

.

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full load rack tr: 8.90

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks

Test sheet Edition

: KHD 12,7 p9 : 06.07.90

Replaces

Test oil : ISO-4113

Combination no.

: 0 400 648 139

Injection pump

Pump designation : PE8A95D410LS2608 : 0 410 698 988

EP type number Governor

Governor design. : RQV450...1150AB1194L

Governer no.

: 0 420 212 171

Customer-spec. information Customer

: KHD

Engine

: F8L413F

1st version kW Rated speed

: 157.0 : 2300

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C

: 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Opening

pressure, bar : 172...175

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values

Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm

: 2.00...2.10 : (1.95...2.15)

Rack travel in mm : 9.00...12.00

Firing order

: 1-8-7-2-6-5-

Phasing

: 0-45-90-135-180-225-

270-315

Tolerance + - °

: 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed

rpm: 900

Rack travel in mm : 10.30...10.40

Del.quantity cm3/: 9.3...9.5

100 s: (9.1...9.7)

Spread

cm3 : 0.3

100 s: (0.6)

rpm : 450.0 2nd speed

Rack travel in mm: 5.9...6.1 Del.quantity cm3/: 1.4...2.0

100 s: (1.1...2.2) cm3 : 0.3

Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 400

travel mm 0.30...0.60

rpm : 750 2nd speed

: 3.50...3.80 : 1050 travel mm

3rd speed rpm

: 6.70...6.90 travel mm

4th speed rpm : 1200

: 8.90...9.40 travel mm

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

rpm : 1150 Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Spread

rpm : 900 Speed

: 93.5...95.5 : (91.5...97.5) Del.quantity 1000

: 3.50

cm3

: (6.00) 1000

1st version Control lever

position degrees: 60...68

Testing:

1st rack travel in: 7.30

rpm : 1170...1180 Speed

2nd rack travel in: 4.00

Speed rpm : 1190...1220 4th rack travel in: 1350

rpm : 0.00...1.00 Speed

LOW IDLE 1

Control lever

position degrees: 6...14 rpm : 450 Speed

Rack travel in mm : 5.90...6.10

CONSTANT REGULATION

rpm : 510...670 Speed

TORQUE CONTROL

Dimension a mm : 1.00

Torque control curve - 1st version

1st speed rpm : 1150

2nd speed

Rack travel in m: 9.30...9.40 and speed rpm : 500 Rack travel in m: 10.30...10.40

3rd speed rpm : 995

Rack travel in m: 10.00...10.20

4th speed rpm : 1080

Rack travel in m: 9.50...9.70

START CUT-OUT

1/min : 370 (390) Speed

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 7.30

rpm : 1170...1180 Speed

STARTING FUEL DELIVERY

rpm : 100 Speed

Del.quantity cm3/: 116.5...126.5 1000 s: (113.5...129.5)

Remarks:

**APPLICATION** 

F15

Note remarks

Test sheet : DAF 6,2 i 1
Edition : 29.05.90
Replaces : 18.12.87
Test oil : ISO-4113

Combination no. : 0 400 676 141

Injection pump

Pump designation : PE6A90D320RS2547 EP type number : 0 410 696 180

Governor

Governor design. : RSV250...1200A5B779R

Governer no. : 0 420 233 121

Customer—spec. information Customer : DAF

Engine : DT615

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

**Opening** 

pressure, bar : 172...175

Test lines : 1 680 750 015

Outside diameter x Wall thickness

x Length mm : 6.00X1.50X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 2.20...2.30

: (2.15...2.35)

Rack travel in mm : 7.50...10.50

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance + - \* : 0.50 (0.75)

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50

& maximum rack tra: 21.00 Difference ° CS : 2.50...3.50

BASIC SETTING

1st speed rpm: 1000

Rack travel in mm : 10.80...10.90

Del.quantity cm3/: 7.1...7.2

100 s: (6.9...7.4)

Spread cm3: 0.3

100 s: (0.4)

2nd speed rpm : 250.0 Rack travel in mm : 5.9...6.1 Del.quantity cm3/: 0.9...1.3

100 s: (0.7...1.5)

Spread cm3 : 0.2

100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800

Rack travel in mm: 0.30...1.00

Governor spring pre-tension

Click setting x : ?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1000 Aneroid pressure h: 700

Del.quantity : 71.0...72.0

1000 : (69.0...74.0)

Spread cm3 : 3.00

1000 : (4.50)

RATED SPEED

1st version

Control lever

position degrees: 97...105

Testing:

1st rack travel in: 9.80 Speed rpm : 1240...1250 2nd rack travel in: 4.00 rpm : 1275...1305 Speed 3rd rack travel in: 4.00 rpm : 1285...1315 Speed 4th rack travel in: 1450 Speed rom : 0.30...1.70LOW IDLE 1 Control lever position degrees: 63...71 Setting point w/out bumper spring : 250 rom Rack travel in mm : 5.5 Testing: : 100 : 250 Speed rpm Speed rpm Rack travel in mm : 5.90...6.10 Rack travel in mm : 2.00 rom : 330...390 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1000 Rack travel in m: 11.10...11.20 2nd speed rpm : 400 Rack travel in m: 11.30...11.40 3rd speed rpm : 300 Rack travel in m: 11.50...12.00 Aneroid/Altitude Compensator Test 1st version Setting : 1000 Speed rpm hPa : 700 Pressure : 10.80...10.90 Rack travel mm Measurement 1/min: 1000 Speed 1st pressure hPa : -Rack travel in m: 9.80...10.00 2nd pressure hPa : 250 Rack travel in m: 10.60...10.70 3rd pressure hPa : 210

Rack travel in m: 10.10...10.40 FUEL DELIVERY CHARACTERISTICS

1st version Aneroid pressure h: rpm : 600 Speed Del.quantity cm3/: 52.0...53.0 1000 s: (50.0...55.0) **BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 9.80 rpm : 1240...1250 Speed

STARTING FUEL DELIVERY

: 100 Speed rpm Del.quantity cm3/: 140.0...150.0 1000 s: (137.0...153.0)

Rack travel in mm : 19.50...21.00

LOW IDLE

Speed rpm : 250 Rack travel in mm : 5.90...6.10 Del.quantity cm3/: 9.0...13.0 1000 s: (7.0...15.0) cm3 : 2.50 Spread

1000 s: (4.50)

Remarks:

Cold-start testing of RSV governor according to VDT-I-420/114.

APPLICATION

Special-purpose vehicle

#### Note remarks

: DAF 8,3 n 5 Test sheet : 21.05.90 Edition : 27.6.88 Replaces Test oil : ISO-4113

Combination no. : 0 400 676 175

Injection pump

Pump designation : PE6A95D41ORS2575 EP type number : 0 410 696 984

Governor

: RSV250...1200A5C2198 Governor design.

-1L

: 0 420 232 442 Governer no.

Customer—spec. information Customer : DAF

Engine : DH 825

# TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

**Opening** 

: 172...175 pressure, bar

Test lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00X1.50X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.00...2.10 Prestroke mm

: (1.95...2.15)
Rack travel in mm : 7.50...10.50
Firing order : 1-5-3-6-

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50

& maximum rack tra: 21.00 Difference ° CS : 3.00...4.00

# BASIC SETTING

1st speed rpm: 1200

Rack travel in mm : 10.40...10.50

Del.quantity cm3/: 7.3...7.4

100 s: (7.1...7.6)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 250.0 2nd speed

Rack travel in mm: 6.1...6.3 Del.quantity cm3/: 0.7...1.1

100 s: (0.4...1.3)

cm3 : 0.3Spread

100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 5.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1200

Del.quantity *: 73.5...74.5* 1000 : (71.5...76.5)

: 3,50 cm3

Spread 1000 : (6.00)

#### RATED SPEED

1st version Control lever

position degrees: 109...117

Testing:

1st rack travel in: 9.40 rpm : 1240...1250 Speed 2nd rack travel in: 4.00 rpm : 1300...1330 Speed 3rd rack travel in: 4.00 rpm : 1340...1370 Speed 4th rack travel in: 1505 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 74...82 Setting point w/out bumper spring rpm : 250 Speed Rack travel in mm : 5.7 Speed rpm : 250 Rack travel in mm : 6.10...6.30 Rack travel in mm : 2.00 : 655...715 Speed rpm TORQUE CONTROL Torque control curve - 1st version rpm : 1200 1st speed Rack travel in m: 10.40...10.50 : 500 2nd speed rpm Rack travel in m: 11.20...11.30 rpm : 800 3rd speed Rack travel in m: 11.10...11.20 4th speed rpm : 940 Rack travel in m: 10.70...11.00 FUEL DELIVERY CHARACTERISTICS 1st version : 800 Speed rom Del.quantity cm3/: 74.5...77.5 1000 s: (72.0...80.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 9.40 rpm : 1240...1250 Speed STARTING FUEL DELIVERY Speed rpm : 100 Del.quantity cm3/: 125.0...140.0 1000 s: (122.0...143.0) Rack travel in mm : 19.50...21.00 Remarks: Cold-start testing of RSV governor

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according to VDT-I-420/114.

Note remarks

: DAF 8,3 n 7 : 21.05.90 : 30.9.88 Test sheet Edition Replaces : TSO-4113 Test oil

Combination no. : 0 400 676 178

Injection pump

Pump designation : PE6A95D410RS2575 : 0 410 696 984 EP type number

Governor

Governor design. : RSV250...750A7C2201L

: 0 420 232 444 Governer no.

Customer-spec. information Customer : DAF

: DHTD 825 Engine

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

Test Lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00X1.50X600 x Lenath mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 2.00...2.10

: (1.95...2.15)

Rack travel in mm : 7.50...10.50

Firing order : 1-5-3-6Phasing : 0-60-120-180-240-300

Tolerance  $+ - \circ : 0.50 (0.75)$ 

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50 & maximum rack tra: 21.00 Difference ° CS : 3.00...4.00

BASIC SETTING

1st speed rpm: 700

Rack travel in mm : 13.20...13.30

Del.guantity cm3/: 11.0...11.1

100 s: (10.8...11.3)

Spread cm3 : 0.3

100 s: (0.6)

2nd speed rpm : 250.0

Rack travel in mm: 6.0...6.2 Del.quantity cm3/: 0.7...1.3

100 s: (0.5...1.4)

cm3 : 0.3 Spread 100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 rpm : 800 Speed

Rack travel in mm : 0.30...0.70

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 700

: 110.5...111.5 Del.quantity : (108.5...113.5) : 3.50 1000

Spread cm3

1000 : (6.00)

RATED SPEED

1st version Control lever

position degrees: 90...98

Testing:

1st rack travel in: 12.20 Speed rpm : 750...755 2nd rack travel in: 4.00

: 780...795 Speed rpm

4th rack travel in: 950

rpm : 0.30...1.40 Speed

LOW IDLE 1 Control Lever

position degrees: 66...74

Setting point w/out bumper spring

rpm : 250 Rack travel in mm: 6.1

Testing:

rpm : 100 Speed Minimum rack trave: 19.50 Speed rpm : 250

Rack travel in mm : 6.00...6.20

Rack travel in mm : 2.00 Speed rpm : 255...315

SET IDLE AUXILIARY SPRING Rack travel in mm : 2.00

STARTING FUEL DELIVERY

: 100 Speed rpm

Rack travel in mm : 19.50...21.00

LOW IDLE

Speed rpm : 250
Rack travel in mm : 6.00...6.20
Del.quantity cm3/ : 7.0...13.0
1000 s: (5.5...14.5)

cm3 : 3.50 1000 s: (5.50) Spread

Remarks:

**APPLICATION** 

Generator

Note remarks

: DAF 6,2 n 3 Test sheet Edition : 29.05.90 : 9.3.87 Replaces Test oil : ISO-4113

Combination no. : 0 400 676 179

Injection pump

Pump designation : PE6A90D320RS2577 EP type number : 0 410 696 181

Governor

Governor design. : RSV250...750A7C2202R

Governer no. : 0 420 233 202

Customer-spec. information Customer : DAF

Engine : DT 615

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

Test lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00X1.50X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.20...2.30 Prestroke mm

: (2.15...2.35)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-Firing order

: 0-60-120-180-240-300 Phasing

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack tray. m: 8.50...9.50

& maximum rack tra: 21.00 Difference ° CS : 2.50...3.50

BASIC SETTING

1st speed rom: 700

Rack travel in mm : 11.00...11.10

Del.quantity cm3/: 7.4...7.5

100 s: (7.2...7.7)

cm3 : 0.3Spread

100 s: (0.5)

rpm : 250.0 2nd speed

Rack travel in mm : 5.9...6.1 Del.quantity cm3/: 0.8...1.4

100 s: (0.6...1.6)

Spread cm3 : 0.2

100 s: (0.4)

GUIDE SLEEVE POSITION

Control-lever position Degree: -3

rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x : 5.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 700 Speed

: 74.5...75.5 Del.quantity

1000 : (72.5...77.5)

: 3.00 Spread cm3

: (5.00) 1000

RATED SPEED

1st version

Control lever

position degrees: 90...98

1st rack travel in: 10.00

rpm : 750...755 Speed 2nd rack travel in: 4.00 rpm : 780...795 Speed 4th rack travel in: 950 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 67...75 Setting point w/out bumper spring rpm : 250 Speed Rack travel in mm: 6.0 Testing: Speed rpm: 100
Minimum rack trave: 19.50
Speed rpm: 250
Rack travel in mm: 5.90...6.10
Rack travel in mm: 2.00 Speed rpm : 280...340 SET IDLE AUXILIARY SPRING Rack travel in mm : 2.00 STARTING FUEL DELIVERY Speed rpm : 100 Rack travel in mm : 19.50...21.00 LOW IDLE rpm : 250 Speed Rack travel in mm: 5.90...6.10 Del.quantity cm3/: 8.0...14.0 1000 s: (6.0...16.0) Spread cm3 : 2.50 1000 s: (4.50) Remarks: APPLICATION

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Generator

Note remarks

: DAF 6,2 m 3 Test sheet : 29.05.90 Edition : 9.3.87 Replaces Test oil : ISO-4113

Combination no. : 0 400 676 181

Injection pump

Pump designation : PE6A85D32ORS2546 : 0 410 686 943 EP type number

Governor

Governor design. : RSV250...750A7C2202R Governor no. : 0 420 233 202

Customer-spec. information Customer : DAF

Engine : DF615

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina

: 172...175 pressure, bar

Test lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.15...2.25 : (2.10...2.30) Prestroke mm

Rack travel in mm : 9.00...12.00

: 1-5-3-6-Firing order

Phasing : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50 & maximum rack tra: 21.00

Difference ° CS : 3.00...4.00

BASIC SETTING

1st speed rpm : 700

Rack travel in mm : 12.10...12.20

Del.quantity cm3/ : 6.6...6.7

100 s: (6.4...6.9)

cm3 : 0.3Spread

100 s: (0.5)

rpm : 250.0 2nd speed

Rack travel in mm: 8.4...8.6 Del.quantity cm3/: 0.9...1.5

100 s: (0.7...1.7)

Spread cm3 : 0.2

100 s: (0.4)

GUIDE SLEEVE POSITION

Control-lever position Degree: -3

rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 3.50

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 700 Speed

: 66.5...67.5 Del.quantity

: (64.5...69.5) 1000

: 3.00 Spread cm3

1000 : (5.00)

RATED SPEED

1st version

Control lever

position degrees: 90...98

Testing:

1st rack travel in: 11.10

Speed rpm: 750...755 2nd rack travel in: 4.00 Speed rom : 780...795

4th rack travel in: 950 Speed rpm : 0.30...1.40

LOW IDLE 1 Control lever

position degrees: 73...82

Setting point w/out bumper spring

rpm : 250 Speed Rack travel in mm: 8.5 Speed rpm : 250
Rack travel in mm : 8.40...8.60
Rack travel in mm : 2.00
Speed rpm : 295...355

SET IDLE AUXILIARY SPRING Rack travel in mm: 2.00

STARTING FUEL DELIVERY

Speed rpm : 100

Rack travel in mm : 19.50...21.00

LOW IDLE

Speed rpm : 250

Rack travel in mm : 8.40...8.60 Del.quantity cm3/: 9.0...15.0 1000 s: (7.0...17.0) Spread cm3 : 2.50 1000 s: (4.50)

Remarks:

APPLICATION

Generator

Note remarks

: DAF 8,3 i 6 Test sheet Edition : 29.05.90 9.3.87 Replaces Test oil : ISO-4113

Combination no. : D 400 676 182

Injection pump

Pump designation: PE6A90D410RS2524 : 0 410 696 179 EP type number

Governor

Governor design. : RSV250...750A7C2201L

: 0 420 232 444 Governer no.

Customer-spec. information : DAF Customer

Engine : DH 825

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Opening.

pressure, bar : 172...175

: 1 680 750 015 Test lines

Outside diameter x Wall thickness

x Length mm : 6.00X1.50X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.30...2.40 Prestroke mm : (2.25...2.45) Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-

: 0-60-120-180-240-300 Phasing

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50

& maximum rack tra: 21.00 Difference ° CS : 4.50...5.50

BASIC SETTING

1st speed rpm: 700

Rack travel in mm : 9.70...9.80

Del.quantity cm3/: 8.3...8.4

100 s: (8.1...8.6)

cm3 : 0.3Spread

100 s: (0.5)

rpm : 250.0 2nd speed

Rack travel in mm: 6.3...6.5 Del.quantity cm3/: 1.9...2.5 100 s: (1.7...2.7)

Spread cm3 : 0.2

100 s: (0.4)

GUIDE SLEEVE POSITION

Control-lever position

Degree: -3 rpm : 800

Speed Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 4.50

FULL LOAD DELTY. AT FULL LOAD STOP

1st version

rpm : 700 Speed

: 83.0...84.0 Del.quantity 1000 : (81.0...86.0)

: 3.00 Spread cm3

1000 : (5.00)

RATED SPEED

1st version Control lever

position degrees: 90...98

Testing:

1st rack travel in: 8.70

rpm : 750...755 Speed 2nd rack travel in: 4.00 Speed rpm: 780...795 4th rack travel in: 950

rpm : 0.30...1.40 Speed

LOW IDLE 1 Control Lever

position degrees: 74...82

Setting point w/out bumper spring

rpm : 250 Speed Rack travel in mm: 6.4 rpm : 250 Speed

Rack travel in mm : 6.30...6.50

Rack travel in mm : 2.00 Speed rpm : 295...355

SET IDLE AUXILIARY SPRING Rack travel in mm : 2.00

STARTING FUEL DELIVERY

Speed : 100 rpm

Rack travel in mm : 19.50...21.00

LOW IDLE

rpm : 250 Speed

Rack travel in mm : 6.30...6.50 Del.quantity cm3/: 19.0...25.0 1000 s: (17.0...27.0) Spread cm3 : 2.50 1000 s: (4.50)

:

Remarks:

**APPLICATION** 

Generator

F27

Note remarks

: CUM 8,3 b10 Test sheet : 08.06.90 Edition : 1.2.90 Replaces

: ISO-4113 Test oil

Combination no. : 0 400 836 043

Injection pump

Pump designation : PES6A100D320/3RS2691

EP type number : 9 410 230 028

Governor

: RQV350...1200AB1245R Governor design.

: 0 420 213 118 Governer no.

Customer-spec, information Customer : C.D.C

Engine : 6CT830

: 157.0 1st version kW Rated speed : 2400

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 017 assembly

**Opening** 

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

Prestroke mm : 2.80...2.90 : (2.75...2.95)

Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1200

Rack travel in mm : 10.80...10.90

Del.quantity cm3/: 11.3...11.5

100 s: (11.1...11.7)

cm3 : 0.4Spread

100 s: (0.6)

rpm : 350.02nd speed Rack travel in mm: 4.7...4.9 Del.quantity cm3/: 1.6...2.0

100 s: (1.3...2.2)

Spread cm3 : 0.6100 s: (0.8)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 250 1st speed

: 0.00...0.20 travel mm 2nd speed : 350 rpm

: 1.00...1.50 travel mm

3rd speed rpm : 450

travel mm : 1.90...2,40

4th speed : 1200 rpm

: 6.90...6.90 travel mm

1350 5th speed rpm

travel mm : 8.15...8.65

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1200 Speed

: 113.0...115.0 Del.quantity 1000 : (111.0...117.0)

: 4.00 Spread cm3

1000 : (6.50)

RATED SPEED

1st version Control lever

position degrees: 42...50

Testina:

1st rack travel in: 9.80

rpm : 1240...1250 Speed

2nd rack travel in: 4.00

rpm : 1315...1345 Speed

4th rack travel in: 1400

rpm : 0.00...1.00Speed

LOW IDLE 1

Control lever

position degrees: 8...16

rpm : 350 Rack travel in mm : 4.70...4.90

START CUT-OUT

1/min: 290 (300) Speed

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 9.80

rpm : 1240...1250 Speed

STARTING FUEL DELIVERY

rpm : 100 Speed

Del.quantity cm3/: 150.0...170.0 1000 s: (145.0...175.0) Rack travel in mm: 19.00...21.00

LOW IDLE

Speed rpm : 350 Rack travel in mm : 4.70...4.90

Del.quantity cm3/: 16.0...20.0 1000 s: (13.5...22.5)

cm3 : 6.001000 s: (8.00)

Remarks:

Spread

: C.D.C. # 3917098

Start-of-delivery mark 11° cam angle

after start of delivery cyl. 1

Adjust stop lever to 0.5...1.0 mm

before stop.

#### Note remarks

Test sheet : KHD 8,0 o 1 Edition : 06.07.90 : 10.85 Replaces Test oil : ISO-4113

Combination no. : 0 400 845 082

Injection pump

Pump designation : PES5A95D410RS2680 EP type number : 0 410 895 972

Governor

Governor design. : RQV300...1150AB1217L

: 0 420 212 186 Governer no.

Customer-spec. information Customer : KHD

: F5L413FFRW Engine

: 85.0 1st version kW : 2300 Rated speed

# TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

pressure, bar : 172...175

: 1 680 750 014 Test lines

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 1.50...1.60 Prestroke mm : (1.45...1.65)

Rack travel in mm : 9.00...12.00

Firing order : 1- 3- 5- 4- 2

: 0-72-144-216-288 Phasing

: 0.50 (0.75) Tolerance + - °

BASIC SETTING

1st speed rpm: 1150

Rack travel in mm : 8.30...8.40

Del.quantity cm3/: 7.2...7.4

100 s: (7.0...7.6)

Spread cm3 : 0.3

100 s: (0.6)

rpm : 300.0 2nd speed Rack travel in mm : 6.4...6.6 Del.quantity cm3/: 1.3...1.7

100 s: (1.0...1.9)

cm3 : 0.3Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 300 1st speed 1.30...1.50 travel mm

rpm : 500 : 3.40...3.60 2nd speed

travel mm 3rd speed : 800 rpm

: 5.20...5.60 travel mm

: 1150 4th speed rpm travel mm : 7.80...8.20

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

rpm : 1200

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1150

: 72.0...74.0 Del.quantity

1000 : (70.0...76.0)

cm3 : 3.50 Spread 1000 : (6.00)

RATED SPEED

1st version

Control lever

position degrees: 116...124

Testina:

1st rack travel in: 7.30

Speed rpm : 1190...1200

2nd rack travel in: 4.00

Speed rpm : 1230...1260 4th rack travel in: 1350

rpm : 0.00...1.00 Speed

LOW IDLE 1 Control lever

position degrees: 65...73

Testing:

Speed : 100 rpm Minimum rack trave: 8.00 rpm : 300

Rack travel in mm : 6.40...6.60

CONSTANT REGULATION

rpm : 320...415 Speed

TORQUE CONTROL

Dimension a mm : 1.40

Torque control curve - 1st version

1st speed

st speed rpm : 1150 Rack travel in m: 8.30...8.40

rpm : 500 2nd speed

Rack travel in m: 9.70...9.80

rpm : 840 3rd speed

Rack travel in m: 9.30...9.50

4th speed rpm : 1010 Rack travel in m: 8.60...8.80

START CUT-OUT

1/min : 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Speed : 700 rpm

Del.quantity cm3/: 80.5...83.5 1000 s: (78.0...86.0)

rpm : 100 Speed

Del.quantity cm3/: 65.0...70.0

1000 s: (62.5...72.5)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 7.30

rpm : 1190...1200 Speed

STARTING FUEL DELIVERY

: 100 Speed rom

Del.quantity cm3/: 120.0...130.0

1000 s: (117.0...133.0)

Rack travel in mm : 14.30...14.70

Remarks:

Check electrically unlatched starting fuel delivery (EES) with 24 volt.

On activation of the starting solenoid, the start position must be reached.

2. Set fuel delivery in fuel-delivery characteristics with stop above the governor housing.

When accelerating from engine speed "O", no voltage in starting solenoid.

**APPLICATION** 

Below-ground operation

Note remarks

Test sheet : MB 6,0 a Fdition : 06.07.90 : 11.7.88 Replaces : ISO-4113 Test oil

Combination no. : 0 400 846 522

Injection pump

Pump designation : PES6A90D410RS2667 : 0 410 896 080 EP type number

Governor

: RQV300...1400AB1065-Governor design.

4L

: 0 420 212 168 Governer no.

Customer-spec. information

: DAIMLER-BENZ Customer

: OM 366 Engine

1st version kW : 100.0 : 2800 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina

: 172...175 pressure, bar

Test Lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00X1.50X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 2.25...2.35

: (2.20...2.40)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

rpm: 1400 1st speed

Rack travel in mm : 11.10...11.20

Del.guantity cm3/: 6.3...6.4

100 s: (6.1...6.6)

cm3 : 0.3Spread

100 s: (0.4)

rpm : 300.02nd speed Rack travel in mm: 8.9...9.1 Del.quantity cm3/: 0.9...1.3

100 s: (0.7...1.5) cm3 : 0.2

Spread 100 s: (0.4)

(B) Setting of injection pump

with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 300

: 0.80...1.30 travel mm

2nd speed : 500 rpm

: 2.30...2.80 travel mm

3rd speed : 750 rpm

travel mm : 4.10...4.30

1500 4th speed rpm

: 8.50...8.60 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

: 1400 Speed man

: 63.5...64.5 Del.quantity

1000 : (61.5...66.5)

cm3 : 3.00 Spread

1000 : (4,50)

RATED SPEED

1st version

Control Lever

position degrees: 108...116

Testing:

1st rack travel in: 10.10

Speed rpm : 1440...1450 2nd rack travel in: 4.00

rpm : 1540...1570 Speed

4th rack travel in: 1650 Speed rpm : 0.00...1.00

LOW IDLE 1 Control lever

position degrees: 74...82

Testing:

rpm Speed Minimum rack trave: 10.30 : 300 Speed rpm

Rack travel in mm : 8.90...9.10

CONSTANT REGULATION

rpm : 540...680 Speed

TORQUE CONTROL

Torque control curve - 1st version

1st speed

st speed rpm : 1400 Rack travel in m: 11.10...11.20

2nd speed rpm : 500

Rack travel in m: 12.20...12.40

rpm : 900 3rd speed

Rack travel in m: 11.80...12.10

4th speed rpm : 1100 Rack travel in m: 11.40...11.70

START CUT-OUT

1/min: 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

: 500 Speed rpm

Del.quantity cm3/: 52.0...54.0 1000 s: (49.5...56.5)

Speed rpm : 900 Del.quantity cm3/: 55.0...58.0 1000 s: (52.5...60.5)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 10.10

rpm : 1440...1450 Speed

STARTING FUEL DELIVERY

rpm : 100 Speed

Del.quantity cm3/: 78.0...88.0

1000 s: (75.0...91.0)

Rack travel in mm : 17.00...17.40

Remarks:

Set shutoff stop to contact at 3.0...3.5 mm control-rod travel.

G05

Note remarks

: DAF 6,2 o 2 Test sheet : 19.03.90 Edition

: 12.1.90 Replaces : ISO-4113 Test oil

Combination no. : 0 400 846 538

Injection pump

Pump designation : PES6A95D32DRS2693

EP type number : 0 410 896 914

Governor

Governor design. : RQ300/1300AB1204R

: 0 420 201 640 Governer no.

Customer-spec. information

: DAF Customer

: DNT 620 Engine

: 130.0 1st version kW : 2600 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Opening

: 172...175 pressure, bar

Test Lines : 1 680 750 015

Outside diameter

x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses

Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.00...2.10 Prestroke mm

: (1.95...2.15)

Rack travel in mm : 7.50...10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50 & maximum rack tra: 21.00

Difference ° CS : 2.50...3.50

BASIC SETTING

1st speed rpm: 850

Rack travel in mm : 11.50...11.60

Del.quantity cm3/: 7.6...7.8

100 s: (7.4...8.0)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.0 2nd speed

Rack travel in mm : 6.5...6.7 Del.quantity cm3/: 0.7...1.1 100 s: (0.4...1.3)

cm3 : 0.3Spread

100 s: (0.5)

GUIDE SLEEVE POSITION

Control-Lever position Degree: -2

rpm : 800 Speed

Rack travel in mm : 19.20...20.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 850 Speed Aneroid pressure h: 700

: 76.0...78.0 Del.quantity

1000 : (74.0...80.0) cm3 : 3.50

Spread

1000 : (6.00)

RATED SPEED

1st version

Setting point:

rpm Rack travel in mm : 20.0

G06

Testina: 1st rack travel in: 9.70 : 1350...1365 Speed rom 2nd rack travel in: 4.00 : 1420...1450 Speed rpm 4th rack travel in: 1550 rom : 0.00...1.00Speed LOW IDLE 1 Setting point w/out bumper spring Speed mom. Rack travel in mm: 6.6 Testing: Speed : 100 rom Minimum rack trave: 7.30 rpm Speed Rack travel in mm : 6.50...6.70 TORQUE CONTROL Dimension a mm : 0.55Torque control curve - 1st version rpm : 1290 1st speed Rack travel in m: 10.70...10.80 rpm : 850 2nd speed Rack travel in m: 12.00...12.40 rpm : 935 3rd speed Rack travel in m: 11.50...11.90 4th speed rpm : 1080 Rack travel in m: 10.80...11.10 Aneroid/Altitude Compensator Test 1st version Setting : 600 Speed rpm hPa : 700 Pressure : 11.50...11.60 Rack travel mm Measurement Speed 1/min: 600 1st pressure hPa : -Rack travel in m: 11.10...11.30 2nd pressure hPa : 250 Rack travel in m: 11.40...11.50 START CUT-OUT 1/min: 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

rpm

: 1290

Aneroid pressure h: 700

Del.quantity cm3/: 74.0...76.0 1000 s: (71.5...78.5) Aneroid pressure h: rpm : 600 Speed Del.quantity cm3/: 65.0...67.0 1000 s: (63.0...69.0) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 9.70 rpm : 1350...1365 Speed STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 130.0...145.0 1000 s: (127.0...148.0) Rack travel in mm : 19.50...21.00 LOW IDLE Speed rpm : 300 Rack travel in mm : 6.50...6.70 Del.quantity cm3/: 7.0...11.0 1000 s: (4.5...13.5) cm3 : 3.50Spread 1000 s: (5.50) Remarks: •

Speed

1st version

Note remarks

: DAF 6,2 p : 29.05.90 Test sheet Edition : 14.7.89 Replaces : ISO-4113 Test oil

Combination no. : 0 400 846 539

Injection pump

Pump designation : PES6A95D32ORS2693 : 0 410 896 914 EP type number

Governor

Governor design. : RQ300/1300AB1205R

: 0 420 201 642 Governer no.

Customer-spec. information Customer : DAF

Engine : DNTD 620

1st version kW : 110.0 Rated speed : 2600

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening |

: 172...175 pressure, bar

Test lines : 1 680 750 015

Outside diameter

x Wall thickness

x Lenath mm : 6.00X1.50X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.00...2.10 Prestroke mm : (1.95...2.15)

Rack travel in mm : 7.50...10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50 & maximum rack tra: 21.00 Difference ° CS : 2.50...3.50

BASIC SETTING

rpm: 850 1st speed

Rack travel in mm : 10.80...10.90

Del.quantity cm3/: 6.4...6.5

100 s: (6.2...6.7)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.02nd speed Rack travel in mm : 6.7...6.9 Del.quantity cm3/: 0.7...1.1 100 s: (0.4...1.3)

cm3 : 0.3Spread 100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -2 rpm : 800

Rack travel in mm : 19.20...20.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed

rpm : 850 Speed

: 64.5...65.5 Del.quantity 1000 : (62.5...67.5)

: 3.50 Spread cm3 1000 : (6.00)

RATED SPEED

1st version

Setting point:

rpm : 800 Rack travel in mm : 20.0

Testing: 1st rack travel in: 9.30 Speed rpm: 1335...1350 2nd rack travel in: 4.00 Speed rpm : 1400...1430 4th rack travel in: 1550 Speed rom : 0.00...1.00LOW IDLE 1 Setting point w/out bumper spring : 300 Speed rpm Rack travel in mm: 6.8 Testina: Speed rpm : 100 Minimum rack trave: 8.00 rpm : 300 Speed Rack travel in mm : 6.70...6.90 Rack travel in mm : 2.00 rpm : 550...590 Speed TORQUE CONTROL Dimension a mm : 0.35 Torque control curve - 1st version 1st speed rpm : 1290 Rack travel in m: 10.30...10.40 rpm : 850 2nd speed Rack travel in m: 11.10...11.50 rpm : 970 3rd speed Rack travel in m: 10.80...11.20 rpm : 1050 4th speed Rack travel in m: 10.50...10.80 START CUT-OUT 1/min: 220 (240) Speed FUEL DELIVERY CHARACTERISTICS 1st version rpm : 1290 Speed Del.quantity cm3/: 69.0...71.0 1000 s: (66.5...73.5) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 9.30 rpm : 1335...1350 Speed STARTING FUEL DELIVERY Speed rpm : 100

Del.quantity cm3/: 130.0...145.0 1000 s: (127.0...148.0) Rack travel in mm : 19.50...21.00

Speed rpm : 300
Rack travel in mm : 6.70...6.90
Del.quantity cm3/: 7.0...11.0
1000 s: (4.5...13.5)
Spread cm3 : 3.50

1000 s: (5.50)

Remarks:

#### Note remarks

Test sheet : KHD 9,6 s
Edition : 17.05.90
Replaces : 12.9.86
Test oil : ISO-4113

Combination no. : 0 400 846 544

Injection pump

Pump designation : PES6A95D410RS2416 EP type number : 0 410 896 961

Governor

Governor design. : RQV300...1250AB1211L

Governer no. : 0 420 212 184

Customer—spec. information Customer : KHD

Engine : F6L413FR

1st version kW : 123.0 Rated speed : 2500

#### TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Opening

pressure, bar : 172...175

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY
Test pressure, bar: 25...27

Prestroke mm : 1.90...2.00 : (1.85...2.05) Rack travel in mm : 9.00...12.00 Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

BASIC SETTING

1st speed rpm: 1250

Rack travel in mm : 10.00...10.10

Del.quantity cm3/: 9.9...10.1

100 s: (9.7...10.3)

Spread cm3 : 0.3

100 s: (0.6)

2nd speed rpm : 300.0 Rack travel in mm : 6.4...6.6 Del.quantity cm3/ : 1.9...2.5 100 s: (1.6...2.7)

Spread cm3 : 0.3 100 s: (0.5)

# (B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 250

travel mm : 1.00...1.20 2nd speed rpm : 500

3rd speed rpm : 1000

travel mm : 6.20...6.40 4th speed rpm : 1250

travel inm : 8.20...8.30

# GUIDE SLEEVE POSITION

Control-lever position

Degree: -1

Speed rpm: 1280

Rack travel in mm : 15.20...17.80

# FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm: 1250

Del.quantity : 99.0...101.0 1000 : (97.0...103.0)

Spread cm3 : 3.50

1000 : (6.00)

# RATED SPEED

1st version

Control Lever

position degrees: 118...126

Testina:

1st rack travel in: 9.00

Speed rpm : 1290...1300

2nd rack travel in: 4.50

rpm : 1350...1380 Speed

4th rack travel in: 1500

Speed rpm : 0.00...1.00

LOW IDLE 1 Control lever

position degrees: 84...92

Testing:

: 100 Speed rpm Minimum rack trave: 8.00 Speed rpm: 300

Rack travel in mm : 6.40...6.60

CONSTANT REGULATION

rpm : 370...485 Speed

TORQUE CONTROL

Dimension a mm : 0.30

Torque control curve - 1st version

1st speed rpm : 1250

Rack travel in m: 10.00...10.10

rpm : 600 2nd speed

Rack travel in m: 10.20...10.30

3rd speed rpm : 715

Rack travel in m: 10.10...10.30 4th speed rpm : 765

Rack travel in m: 10.00...10.30

START CUT-OUT

1/min: 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

rpm : 600 Speed

Del.quantity cm3/: 91.5...94.5 1000 s: (89.0...97.0)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 9.00

rpm : 1290...1300 Speed

INTERMEDIATE RATED SPEED Rack travel in mm: 4.00 STARTING FUEL DELIVERY

rpm : 100 Speed

Del.quantity cm3/: 120.0...130.0 1000 s: (117.0...133.0)

Rack travel in mm : 14.20...14.60

LOW IDLE

rpm : 300 Speed

Rack travel in mm : 6.40...6.60 Del.quantity cm3/: 19.0...25.0 1000 s: (16.5...27.5) Spread cm3 : 3.50

1000 s: (5.50)

Remarks:

APPLICATION

Special-purpose vehicle

G11

#### Note remarks

: KHD 9.6 m 1 : 06.07.90 Test sheet Edition Replaces : 8.9.89 Test oil : ISO-4113

Combination no. : 0 400 846 545

Injection pump

Pump designation : PES6A95D41ORS2681 EP type number : 0 410 896 918

Governor

Governor design. : RQV300...1150AB1217L

: 0 420 212 186 Governer no.

Customer-spec. information : KHD Customer

: F6L413FRW Engine

: 102.0 1st version kW : 2300 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

**Opening** 

pressure, bar : 172...175

Test lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 1.50...1.60 : (1.45...1.65) Prestroke mm

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

1st speed rpm: 1150

Rack travel in mm : 8.30...8.40

Del.quantity cm3/ : 7.2...7.4

100 s: (7.0...7.6)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.02nd speed Rack travel in mm: 6.4...6.6 Del.quantity cm3/: 1.3...1.7

100 s: (1.0...1.9) cm3 : 0.3Spread

100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

: 300 1st speed rpm

: 1.30...1.50 travel mm : 500

2nd speed rpm travel mm : 3.40...3.60

: 800 3rd speed rpm

: 5.20...5.60 : 1150 travel mm 4th speed rpm

: 7.80...8.20 travel mm

GUIDE SLEEVE POSITION

Control-lever position

Degree: -1 rpm : 1200

Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1150 Speed

: 72.0...74.0 Del.quantity 1000 : (70.0...76.0)

: 3.50 cm3 Spread

1000 : (6.00)

RATED SPEED

1st version

Control lever

position degrees: 116...124

Testing:

1st rack travel in: 7.30

rpm : 1190...1200 Speed

2nd rack travel in: 4.00

rpm : 1230...1260 Speed

4th rack travel in: 1350

Speed rpm : 0.00...1.00

LOW IDLE 1 Control Lever

position degrees: 65...73

Testina:

Speed : 100 rpm Minimum rack trave: 8.00 Speed rpm: 300

Rack travel in mm : 6.40...6.60

CONSTANT REGULATION

rpm : 320...415 Speed

TORQUE CONTROL

Dimension a mm : 1.40

Torque control curve - 1st version

rpm : 1150 1st speed

Rack travel in m: 8.30...8.40

rpm : 500 2nd speed

Rack travel in m: 9.70...9.80

3rd speed rpm : 840

Rack travel in m: 9.30...9.50 4th speed rpm : 1010

Rack travel in m: 8.60...8.80

START CUT-OUT

1/min : 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Speed : 700 rpm

Del.quantity cm3/: 80.5...83.5 1000 s: (78.0...86.0) Speed rpm : 100

Del.quantity cm3/: 65.0...70.0 1000 s: (62.5...72.5)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 7.30

Speed rpm : 1190...1200 STARTING FUEL DELIVERY

: 100 Speed rom

Del.quantity cm3/: 120.0...130.0 Rack travel in mm: 14.40...14.80

Remarks:

Check electrically unlatched starting fuel delivery (EES) with 24 volt.

On activation of the starting solenoid, the start position must be reached.

2. Set fuel delivery in fuel-delivery characteristics with stop above the governor housing.

When accelerating from engine speed "O", no voltage in starting solenoid.

APPLICATION

Below-ground operation

Note remarks

Test sheet : LIE 8,4 b 1 : 10.08.90 Edition : 25.8.89 Replaces : ISO-4113 Test oil

Combination no. : 0 400 846 562

Injection pump

Pump designation : PES6A100D410RS2687

: 0 410 806 001 EP type number

Governor

Governor design. : RQV400...1000AB1231L

: 0 420 212 206 Governer no.

Customer-spec. information Customer : LIEBHERR

: D906TI Engine

1st version kW : 169.0 Rated speed : 2000

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina

: 172...175 pressure, bar

Test Lines : 1 680 750 008

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 2.70...2.80

: (2.65...2.85)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasina

Tolerance + - ° : 0.50 (0.75)

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 9.00...12.00 & maximum rack tra: 21.00

Difference ° CS : 4.00...5.00

BASIC SETTING

1st speed rpm: 1000

Rack travel in mm : 13.70...13.80

Del.guantity cm3/: 13.9...14.1

100 s: (13.7...14.3)

Spread cm3 : 0.3

100 s: (0.6)

2nd speed rpm : 400.0

Rack travel in mm : 6.8...7.0 Del.quantity cm3/ : 1.0...1.6

100 s: (0.7...1.8)

cm3 : 0.3Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 4401st speed

2.10...2.30 travel mm

500 2nd speed rpm

3.00...3.50 travel mm

rpm : 585 3rd speed

: 3.50...4.00 travel mm : 1045

4th speed rpm : 8.10...8.20 travel mm

: 1135 5th speed rpm

: 9.40...9.70 travel mm

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

rpm : 1065 Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1000

Aneroid pressure h: 700 : 139.0...141.0 Del.quantity 1000 : (137.0...143.0) cm3 : 3.50 Spread 1000 : (6.00) RATED SPEED 1st version Control Lever position degrees: 116...124 Testing: 1st rack travel in: 12.70 rpm : 1040...1050 Speed 2nd rack travel in: 4.00 rpm : 1130...1160 Speed 4th rack travel in: 1250 rpm : 0.00...1.00Speed LOW IDLE 1 Control Lever position degrees: 66...74 Testing: Speed rpm : 100 Minimum rack trave: 8.30 rpm : 400 Rack travel in mm : 6.80...7.00 CONSTANT REGULATION rpm : 425...500 Speed TORQUE CONTROL Dimension a mm Torque control curve - 1st version 1st speed rpm : 1000 Rack travel in m: 13.70...13.80 2nd speed rpm : 500 Rack travel in m: 13.70...13.90 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm hPa : 700 Pressure : 13.70...13.80 Rack travel mm Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 12.60...12.80 2nd pressure hPa : 435 Rack travel in m: 13.30...13.40 3rd pressure hPa : 410 Rack travel in m: 12.80...13.00

START CUT-OUT

Speed 1/min: 320 (340)

FUEL DELIVERY CHARACTERISTICS

1st version

Speed rpm : 700 Del.quantity cm3/ : 134.0...136.0 1000 s: (131.5...138.5)

Aneroid pressure h: rpm : 500 Speed

Del.quantity cm3/: 104.5...106.5

1000 s: (102.5...108.5)

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 12.70

rpm : 1040...1050 Speed

STARTING FUEL DELIVERY

rpm : 100 Speed

Del.quantity cm3/: 105.0...115.0

1000 s: (102.0...118.0)

Rack travel in mm : 19.50...21.00

LOW IDLE

rpm : 400 Speed

Rack travel in mm : 6.80...7.00 Del.quantity cm3/: 10.0...16.0

1000 s: (7.5...18.5)

cm3 : 3.50 1000 s: (5.50) Spread

:

Remarks:

G15

: 1-5-3-6-2-4 BOSCH INJ. PUMP TEST SPECIFICATIONS Firing order Note remarks Test sheet : RAB 9,7 b 2 Phasing : 0-60-120-180-240-300 Edition : 31.07.90 : 9.11.89 Tolerance + - ° : 0.50 (0.75) Replaces Test oil : ISO-4113 Time to cyl. no. : 1 Combination no. : 0 400 846 576 BASIC SETTING Injection pump Pump designation : PES6A95D42OLS2595 rpm: 1050 1st speed : 0 410 896 930 EP type number Rack travel in mm : 12.40...12.50 Governor Governor design. : RQ200/1050AB1246R Del.quantity cm3/: 12.4...12.6 : 0 420 201 647 Governer no. 100 s: (12.2...12.8) Customer-spec. information Customer : RABA cm3 : 0.3Spread : D2156 MT6U Engine 100 s: (0.6) : 154.0 1st version kW 2nd speed rpm : 200.0 Rack travel in mm : 7.2...7.4 Del.quantity cm3/ : 1.1...1.5 : 2100 Rated speed TEST BENCH REQUIREMENTS 100 s: (0.8...1.7) Test oil Spread cm3 : 0.3inlet temp. °C : 38...42 100 s: (0.5) GUIDE SLEEVE POSITION Overflow valve : 1 417 413 000 Control-lever position Degree: -2 rpm : 500 Inlet press., bar: 1.50 Speed Rack travel in mm : 19.20...20.80 Test nozzle holder : 0 681 343 009 FULL LOAD DELIV. AT FULL LOAD STOP assembly 1st version Opening 1 : 172...175 Speed rpm : 1050 pressure, bar Aneroid pressure h: 700 : 124.5...126.5 Del.quantity 1000 : (122.5...128.5) Test lines : 1 680 750 014 : 3.50 Spread cm3 1000 : (6.00) Outside diameter x Wall thickness : 6.00X2.00X600 RATED SPEED x Length mm 1st version (A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. Setting point: : 500 per values \_\_\_ Speed rpm Rack travel in mm: 20.0 BEGINNING OF DELIVERY Test pressure, bar: 25...27 Testing: 1st rack travel in: 11.40 : 2.00...2.10 Prestroke mm Speed rpm : 1095...1110 : (1.95...2.05) 2nd rack travel in: 4.00

rpm : 1130...1160

Speed

Rack travel in mm : 9.00...12.00

4th rack travel in: 1225

rpm : 0.00...1.00 Speed

LOW IDLE 1

Setting point w/out bumper spring

Speed rpm : 200 Rack travel in mm: 6.5

Testing:

: 100 Speed rpm Minimum rack trave: 8.00 ; 200 Speed rpm

Rack travel in mm: 6.40...6.60 Rack travel in mm: 2.00 Speed rpm: 290...330

TORQUE CONTROL

Dimension a mm : 0.40

Torque control curve - 1st version

1st speed rpm : 1050

Rack travel in m: 12.40...12.50

rpm : 450 2nd speed

Rack travel in m: 13.40...13.80

3rd speed rpm : 680

Rack travel in m: 12.90...13.30

rpm : 830 4th speed

Rack travel in m: 12.60...12.90

Aneroid/Altitude Compensator Test

1st version

Settina

: 500 Speed rpm hPa : 700 Pressure

Rack travel mm : 13.20...13.30

Measurement

1/min: 500 Speed

Rack travel in m: 10.80...11.00 2nd pressure hPa : 220 Rack travel in m: 12.40...12.50

3rd pressure hPa : 150

Rack travel in m: 11.10...11.30

START CUT-OUT

1/min : 140 (160) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 700

Speed rpm : 600 Del.quantity cm3/: 120.5...123.5 1000 s: (118.0...126.0)

Speed rpm : 500 Del.quantity cm3/: 79.0...81.0 1000 s: (77.0...83.0)

RACK STOP ADJUSTMENT

: 500 Speed rom

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 11.40

rpm : 1095...1110 Speed

STARTING FUEL DELIVERY

rpm : 100 Speed

Del.quantity cm3/: 153.0...163.0 1000 s: (150.0...166.0)

Rack travel in mm : 17.50...17.70

Remarks:

Set idle stop at 200 min -1 to a

control-rod travel of 6.4 mm

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks : IHC 7,6 y : 08.06.90 Test sheet Edition Replaces Test oil : ISO-4113 Combination no. : 0 400 846 579 Injection pump Pump designation : PES6A95D32ORS2779 : 0 410 896 903 EP type number Governor : RQV350...1350AB1248-Governor design. : 0 420 213 120 Governer no. Customer-spec. information : NAVISTAR Customer : DT 360 Engine : 126.0 1st version kW : 2700 Rated speed TEST BENCH REQUIREMENTS Test oil inlet temp. °C : 38...42 Overflow valve : 2 417 413 038 Inlet press., bar: 2.80 Test nozzle holder assembly : 1 688 901 110 Openina : 250...253 pressure, bar Orifice plate diameter mm : 0.5 Test lines : 1 680 750 008

Outside diameter x Wall thickness : 6.00X2.00X600 x Length mm (A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values BEGINNING OF DELIVERY

Prestroke mm : 2.65...2.75 : (2.60...2.80) Rack travel in mm : 10.50 : 1-5-3-6-2-4 Firing order : 0-60-120-180-240-300 Phasing Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ Time to cyl. no. : 1 BASIC SETTING rpm: 1350 1st speed Rack travel in mm : 12.30...12.40 Del.quantity cm3/: 8.4...8.6 100 s: (8.2...8.8) cm3 : 0.3Spread 100 s: (0.6) 2nd speed rpm : 350.0 Rack travel in mm : 5.9...6.1 Del.quantity cm3/ : 1.7...2.1 100 s: (1.5...2.3) cm3 : 0.3Spread 100 s: (0.5) (B) Setting of injection pump with governor GUIDE SLEEVE TRAVEL rpm : 1350 1st speed : 7.30...7.50 travel mm : 1460 2nd speed rpm : 8.10...8.50 travel mm : 550 3rd speed rpm travel mm : 3.10...3.70 4th speed : 350 rpm : 1.30...1.70 travel mm FULL LOAD DELIV. AT FULL LOAD STOP 1st version Speed rpm : 1350 Aneroid pressure h: 900 : 84.0...86.0 Del.quantity 1000 : (82.0...88.0) : 3.50 Spread cm3 1000 : (6.00) RATED SPEED

Test pressure, bar: 27...29

1st version Control lever

position degrees: 44...52

Testing:

1st rack travel in: 11.30

rpm : 1390...1420 Speed

2nd rack travel in: 4.00

rpm : 1525...1535 Speed

4th rack travel in: 1625

Speed rpm : 0.00...1.00

LOW IDLE 1 Control lever

position degrees: 11...19

Testina:

Speed rpm : 100 Minimum rack trave: 9.00

Speed rpm : 350 Rack travel in mm : 5.90...6.10

CONSTANT REGULATION

rpm : 350...500 Speed

Aneroid/Altitude Compensator Test

1st version

Setting

Speed : 500 rom hPa : 900 Pressure

Rack travel mm : 12.30...12.40

Measurement

1/min: 500 Speed

1st pressure hPa : -

Rack travel in m: 9.10...9.30

2nd pressure hPa : 240 Rack travel in m: 10.00...10.10

3rd pressure hPa : 445

Rack travel in m: 11.20...11.60

START CUT-OUT

1/min: 270 (280) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: -

rpm\_ : 500 Del.quantity cm3/: 61.5...65.5

1000 s: (59.5...67.5)

BREAKAWAY

1st version

1mm rack travel less than

full load rack tr: 11.30

rpm : 1390...1420 Speed

STARTING FUEL DELIVERY

rpm\_ : 100 Speed

Del.quantity cm3/: 135.0...155.0 1000 s: (130.0...160.0) Rack travel in mm: 16.20...17.00

LOW IDLE

rpm : 350 Speed

Rack travel in mm : 5.90...6.10 Del.quantity cm3/: 17.0...21.0 1000 s: (15.0...23.0)

cm3 : 3.50Spread

1000 s: (5.50)

Remarks:

: NAVISTAR #1816726C91

Adjust stop lever to 0.5...1.0 mm before stop.

Start-of-delivery mark is at start of delivery of cylinder 1

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks Test sheet : IHC 7,6 y 1 : 08.06.90 Edition Replaces : TSO-4113 Test oil : 0 400 846 580 Combination no. Injection pump : PES6A95D32ORS2779 Pump designation : 0 410 896 903 EP type number Governor Governor design. : RQV350...1350AB1248-1R : 0 420 213 121 Governer no. Customer-spec. information : NAVISTAR Customer Engine : DTA 360 : 138.0 1st version kW : 2700 Rated speed TEST BENCH REQUIREMENTS Test oil inlet temp. °C : 38...42 Overflow valve : 2 417 413 038 Inlet press., bar: 2.80 Test nozzle holder : 1 688 901 110 assembly Opening | : 250...253 pressure, bar Orifice plate diameter mm : 0,5 Test lines : 1 680 750 008 Outside diameter x Wall thickness x Length mm : 6.00X2.00X600 (A) Injection pump setting values

Insp. values in parentheses

Set equal delivery quant.

per values

Test pressure, bar: 27...29

BEGINNING OF DELIVERY

Prestroke mm : 2.65...2.75 : (2.60...2.80) Rack travel in mm: 10.50 : 1-5-3-6-2-4 Firing order : 0-60-120-180-240-300 Phasing Tolerance + - ° : 0.50 (0.75) Time to cyl. no. : 1 BASIC SETTING rpm : 13501st speed Rack travel in mm : 12.30...12.40 Del.quantity cm3/: 8.4...8.6 100 s: (8.2...8.8) Spread cm3 : 0.3100 s: (0.6) rpm : 350.02nd speed Rack travel in mm: 5.9...6.1 Del.quantity cm3/: 1.7...2.1 100 s: (1.5...2.3) cm3 : 0.3Spread 100 s: (0.5) (B) Setting of injection pump with governor GUIDE SLEEVE TRAVEL : 1350 1st speed : 7.30...7.50 travel mm : 1460 2nd speed rpm travel mm : 8.10...8.50 550 3rd speed rpm : 3.10...3.70 : 350 travel mm 4th speed rpm : 1.30...1.70 travel mm FULL LOAD DELIV. AT FULL LOAD STOP 1st version Speed rpm : 1350 Aneroid pressure h: 900 : 84.0...86.0 Del.quantity 1000 : (82.0...88.0) : 3.50 Spread cm3 : (6.00) 1000 RATED SPEED

1st version Control Lever

position degrees: 44...52

Testina:

1st rack travel in: 11.30

rpm : 1390...1420 Speed

2nd rack travel in: 4.00 Speed rpm : 1525...1535

4th rack travel in: 1625

: 0.00...1.00 Speed rpm

LOW IDLE 1 Control lever

position degrees: 11...19 Setting point w/out bumper spring

rpm : 350

Rack travel in mm: 6.0

Testina:

: 100 Speed rpm Minimum rack trave: 9.00 : 350 Speed rom

Rack travel in mm : 5.90...6.10

CONSTANT REGULATION

rpm : 350...500 Speed

Aneroid/Altitude Compensator Test

1st version

Settina

: 500 Speed rom hPa : 900 Pressure

: 12.30...12.40 Rack travel mm

Measurement

1/min: 500 Speed

1st pressure hPa : -

Rack travel in m: 9.20...9.40

2nd pressure hPa : 215

Rack travel in m: 10.00...10.10 3rd pressure hPa : 430

Rack travel in m: 11.30...11.70

START CUT-OUT

1/min: 270 (280) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: -

: 500 Speed rpm

Del.quantity cm3/: 63.5...67.5

1000 s: (62.5...69.5)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 11.30

rpm : 1390...1420 Speed

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 145.0...165.0

1000 s: (140.0...170.0)

Rack travel in mm : 20.00...21.00

LOW IDLE

Speed rpm : 350 Rack travel in mm : 5.90...6.10

Del.guantity cm3/: 17.0...21.0 1000 s: (15.0...23.0)

cm3 : 3.50 Spread

1000 s: (5.50)

Remarks:

: NAVISTAR #1816728C91

Adjust stop lever to 0.5...1.0 mm before stop.

Start-of-delivery mark is at start of delivery of cylinder 1

Note remarks

Test sheet : MB 6,0 j : 31.07.90 Edition

Replaces

Test oil : ISO-4113

: 0 400 846 584 Combination no.

Injection pump

Pump designation : PES6A95D410RS2797 : 0 410 896 900 EP type number

Governor

: RQV300...1400AB1065-Governor design.

20L

: 0 420 212 225 Governer no.

Customer—spec. information

: MERCEDES-BENZ Customer

Engine : OM 366

1st version kW : 97.0 : 2800 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

pressure, bar : 172...175

Test lines : 1 680 750 015

Outside diameter

x Wall thickness

: 6.00X1.50X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 3.20...3.30 Prestroke mm

: (3.15...3.35)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

rpm: 1400 1st speed

Rack travel in mm : 9.30...9.40

Del.quantity cm3/: 6.6...6.8

100 s: (6.4...7.0)

cm3 : 0.3Spread

100 s: (0.6)

2nd speed rpm : 300.0 Rack travel in mm : 8.0...8.2

Del.quantity cm3/: 0.8...1.2

100 s: (0.5...1.4)

cm3 : 0.3Spread 100 s: (0.5)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 3001st speed

: 0.80...1.30 travel mm 2nd speed : 500 rpm

: 2.30...2.80 travel mm

rpm : 750 3rd speed

travel mm : 4.10...4.30

: 1500 4th speed man

: 8.50...8.60 travel mm

GUIDE SLEEVE POSITION

Control-Lever position Degree: -1

rpm : 1450 Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1400 Speed

: 66.0...68.0 Del.quantity 1000 : (64.0...70.0)

: 3.50 cm3 Spread

1000 : (6.00)

RATED SPEED

1st version Control Lever

position degrees: 109...117

Testing:

1st rack travel in: 8.30

rpm : 1450...1460 Speed

2nd rack travel in: 4.00

Speed rpm : 1520...1550 4th rack travel in: 1670

rpm : 0.00...1.00 Speed

LOW IDLE 1 Control Lever

position degrees: 70...78

Testing:

Speed man Minimum rack trave: 9.50 rpm : 300 Speed

Rack travel in mm : 8.00...8.20

CONSTANT REGULATION

rpm : 450...580 Speed

TORQUE CONTROL

Dimension a mm : 0.90

Torque control curve - 1st version

1st speed rpm : 1400

Rack travel in m: 9.30...9.40

rpm : 600 2nd speed

Rack travel in m: 10.20...10.40

rpm : 900 3rd speed

Rack travel in m: 9.50...9.80

START CUT-OUT

1/min: 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Speed rpm : 500
Del.quantity cm3/: 53.0...56.0
1000 s: (50.5...58.5)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 8.30

rpm : 1450...1460 Speed

STARTING FUEL DELIVERY

Speed rpm : 100

Del.quantity cm3/: 78.0...88.0

1000 s: (75.0...91.0) Rack travel in mm : 13.70...14.10

Remarks:

Set shutoff stop to contact at 3.0...3.5 mm control-rod travel.

G23

Note remarks

: MWM 3,1 b 2 Test sheet : 31.08.90 : 30.3.90 Edition Replaces Test oil : ISO-4113

: 0 400 863 008 Combination no.

Injection pump

Pump designation: PES3A90D320/3RS2658

: 0 410 893 004 EP type number

Governor

: RSV325...1500A2C505-Governor design.

3R

: 0 420 233 229 Governer no.

Customer-spec. information Customer

: D226B-3 Engine

: 49.5 1st version kW Rated speed : 3000

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening |

pressure, bar : 172...175

Test lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.95...3.05 Prestroke mm

: (2.90...3.10)

Rack travel in mm : 9.00...12.00

Firing order : 1- 2- 3

: 0-120-240 Phasing

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 9.00...0.00 & maximum rack tra: 21.00 Difference ° CS : 3.50...4.50

BASIC SETTING

1st speed rpm: 1100

Rack travel in mm : 11.20...11.30

Del.quantity cm3/: 8.9...9.0

100 s: (8.7...9.2)

Spread cm3 : 0.3

100 s: (0.5)

2nd speed rpm : 325.0 Rack travel in mm : 9.7...9.9 Del.quantity cm3/ : 4.6...5.2

100 s: (4.4...5.4)

Spread cm3 : 0.2 100 s: (0.4)

GUIDE SLEEVE POSITION

Control-lever position Degree: -3

rpm : 800 Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 2.50

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1100 Speed

: 89.5...90.5 Del.quantity 1000 : (87.5...92.5)

Spread cm3 : 3.00 1000 : (5.00)

RATED SPEED

1st version Control lever

position degrees: 89...97

Testing: 1st rack travel in: 10.20 rpm : 1140...1150 Speed 2nd rack travel in: 4.00 rpm : 1180...1210 Speed 3rd rack travel in: 4.00 Speed rpm : 1210...1240 4th rack travel in: 1375 rpm : 0.30...1.40 Speed LOW IDLE 1 Control Lever position degrees: 63...71 Setting point w/out bumper spring Speed rpm: 325 Rack travel in mm: 9.3 Speed rpm : 325 Rack travel in mm : 9.70...9.90 Rack travel in mm : 2.00 Speed rpm : 480...540 TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1100 Rack travel in m: 11.20...11.30 2nd speed rpm : 500 Rack travel in m: 11.20...11.40 BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 10.20 rpm : 1140...1150 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 115.0 1000 s: (112.0) Rack travel in mm : 16.80...21.00 Remarks:

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks : KHD 3,0 f : 21.05.90 Test sheet Edition : 6.4.90 Replaces Test oil : ISO-4113 Combination no. : 0 400 863 016 Injection pump Pump designation : PES3A85D410/3RS2780 : 0 410 883 987 EP type number Governor Governor design. : RSV325...1250A2C2239 -1L : 0 420 232 533 Governer no. Customer-spec. information Customer : KHD : F3L912 F Enaine 1st version kW : 40.0 : 2500 Rated speed TEST BENCH REQUIREMENTS Test oil inlet temp. °C : 38...42 Overflow valve : 1 417 413 000 Inlet press., bar: 1.50 Test nozzle holder : 0 681 343 009 assembly **Opening** pressure, bar : 172...175 Test Lines : 1 680 750 014 Outside diameter x Wall thickness x Length mm : 6.00X2.00X600

(A) Injection pump setting values

per values \_\_\_\_

Test pressure, bar: 25...27

BEGINNING OF DELIVERY

Prestroke mm

Insp. values in parentheses Set equal delivery quant.

: 2.95...3.05

: (2.90...3.10)

Rack travel in mm : 9.00...12.00 : 1- 3- 2 Firing order Phasing : 0-120-240 Tolerance + - ° : 0.50 (0.75) Time to cyl. no. : 1 BASIC SETTING rpm: 1235 1st speed Rack travel in mm : 11.40...11.50 Del.quantity cm3/: 6.4...6.5 100 s: (6.2...6.7) Spread cm3 : 0.3100 s: (0.5) 2nd speed rpm : 325.0
Rack travel in mm : 8.1...8.3
Del.quantity cm3/: 1.0...1.6 100 s: (0.8...1.8) cm3 : 0.2Spread 100 s: (0.4) GUIDE SLEEVE POSITION Control-lever position Degree: -3 rpm : 800 Speed Rack travel in mm : 0.30...0.70 Governor spring pre-tension Click setting x : 5.00 FULL LOAD DELIV. AT FULL LOAD STOP 1st version Speed rpm : 1235 : 64.0...65.0 Del.quantity 1000 : (62.0...67.0) Spread : 3.00 cm3 1000 : (5.00)RATED SPEED 1st version Control lever position degrees: 100...108 Testing: 1st rack travel in: 10.40 rpm : 1275...1285

2nd rack travel in: 4.00

rpm : 1345...1375 Speed 3rd rack travel in: 4.00 Speed rpm : 1355...1385 4th rack travel in: 1520 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 71...79 Setting point w/out bumper spring Speed rpm : 325 Rack travel in mm : 5.5 Testing: rpm : 100 Speed Minimum rack trave: 19.50 Speed rpm : 325
Rack travel in mm : 5.90...6.10
Rack travel in mm : 2.00 rpm : 435...495 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1235 Rack travel in m: 11.40...-11.50 nd speed rpm : 500 Rack travel in m: 11.60...11.70 2nd speed 3rd speed rpm : 840 Rack travel in m: 11.50...11.60 FUEL DELIVERY CHARACTERISTICS 1st version : 750 Speed rpm Del.quantity cm3/: 55.0...57.0 1000 s: (52.5...59.5) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 10.40 rpm : 1275...1285 Speed STARTING FUEL DELIVERY Speed : 100 rpm Del.quantity cm3/: 115.0...125.0 1000 s: (112.0...128.0) Rack travel in mm : 19.50...21.00 Remarks: :

Note remarks

Test sheet : MWM 4,1 b 1 : 31.08.90 Edition Replaces : 5.8.88 : ISO-4113 Test oil

Combination no. : 0 400 864 057

Injection pump

Pump designation: PES4A90D320/3RS2659

: 0 410 894 028 EP type number

Governor

Governor design. : RSV325...1500A2C505-

2R

: D 420 233 196 Governer no.

Customer-spec. information Customer : MWM

: D2268-4 Engine

1st version kW : 73.5 : 3000 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

**Opening** 

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values \_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.95...3.05 Prestroke mm

: (2.90...3.10)

Rack travel in mm : 9.00...12.00

Firing order : 1- 3- 4- 2

: 0-90-180-270 Phasing

: 0.50 (0.75) Tolerance + - °

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 9.00...0.00 & maximum rack tra: 21.00 Difference ° CS : 3.50...4.50

BASIC SETTING

1st speed rpm: 1500

Rack travel in mm : 11.20...11.30

Del.quantity cm3/: 9.0...9.1

100 s: (8.8...9.3)

cm3 : 0.3Spread

100 s: (0.5)

2nd speed rpm : 325.0 Rack travel in mm : 7.0...7.2

Del.quantity cm3/: 0.8...1.4

100 s: (0.6...1.6) cm3 : 0.2 100 s: (0.4)

Spread

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800 Rack travel in mm: 0.30...0.70

Governor spring pre-tension Click setting x : 4.75

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1500 Speed

Del.quantity : 90.0...91.0 1000 : (88.0...93.0)

: 3.00 Spread cm3

1000 : (5.00)

RATED SPEED

1st version

Control lever

position degrees: 109...117

Testing: 1st rack travel in: 9.50 rpm : 1540...1550 Speed 2nd rack travel in: 4.00 rpm : 1590...1620 Speed 3rd rack travel in: 4.00 rpm : 1615...1645 Speed 4th rack travel in: 1780 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 70...78 Setting point w/out bumper spring rpm : 325 Speed Rack travel in mm : 6.6 Testing: Speed : 100 rpm Minimum rack trave: 19.50 rpm : 325 Rack travel in mm : 7.00...7.20 Rack travel in mm: 2.00 : 465...525 Speed rom TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1500 Rack travel in m: 11.20...11.30 2nd speed rpm : 500 Rack travel in m: 11.20...11.40 **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 9.50 rpm : 1540...1550 Speed STARTING FUEL DELIVERY Speed rpm : 100 Del.quantity cm3/: 130.0...140.0 1000 s: (127.0...143.0)

Rack travel in mm: 19.50...21.00 Remarks:

Note remarks

: KHD 4,1 i : 21.05.90 : 6.4.90 Test sheet Edition Replaces Test oil : ISO-4113

Combination no. : 0 400 864 075

Injection pump

Pump designation : PES4A85D410/3RS2781

: 0 410 884 945 EP type number

Governor

Governor design. : RSV325...1250A2C2239

-1L

: 0 420 232 533 Governer no.

Customer-spec. information Customer : KHD

: F4L912F Engine

1st version kW : 54.0 : 2500 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening |

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.95...3.05 Prestroke mm

: (2.90...3.10)

Rack travel in mm : 9.00...12.00

: 1- 3- 4- 2 Firing order

: 0-90-180-270 Phasina

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

1st speed rpm: 1235

Rack travel in mm : 11.40...11.50

Del.quantity cm3/: 6.4...6.5

100 s: (6.2...6.7)

cm3 : 0.3Spread

100 s: (0.5)

rpm : 325.0 2nd speed Rack travel in mm: 8.1...8.3 Del.quantity cm3/: 1.0...1.6 100 s: (0.8...1.8)

cm3 : 0.2Spread

100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800 Rack travel in mm: 0.30...0.70

Governor spring pre-tension Click setting x : 5.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1235 Speed

Del.quantity : 64.0...65.0 1000 : (62.0...67.0)

cm3 : 3.00 Spread

1000 : (5.00)

RATED SPEED

1st version

Control lever

position degrees: 100...108

Testina:

1st rack travel in: 10.40

Speed rpm: 1275...1285 2nd rack travel in: 4.00

: 1345...1375 Speed rpm

3rd rack travel in: 4.00

rpm : 1355...1385 Speed 4th rack travel in: 1520 rpm : 0.30...1.40Speed LOW IDLE 1 Control lever position degrees: 68...76 Setting point w/out bumper spring Speed rpm : 325 Rack travel in mm : 5.5 Testing: : 100 Speed rpm Minimum rack trave: 19.50 Speed rpm : 325
Rack travel in mm : 5.90...6.10
Rack travel in mm : 2.00 : 435...495 Speed rpm TORQUE CONTROL Torque control curve - 1st version rpm : 1235 1st speed Rack travel in m: 11.40...11.50 rpm : 500 2nd speed Rack travel in m: 11.60...11.70 3rd speed rpm : 840 Rack travel in m: 11.50...11.60 FUEL DELIVERY CHARACTERISTICS 1st version : 750 Speed rpm Del.quantity cm3/: 55.0...57.0 1000 s: (52.5...59.5) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 10.40 Speed rpm : 1275...1285 STARTING FUEL DELIVERY Speed rpm : 100

Remarks:

Note remarks

: MWM 4,1 b 3 Test sheet : 31.08.90 Edition

Replaces

: ISO-4113 Test oil

Combination no. : 0 400 864 079

Injection pump

Pump designation : PES4A90D320/3RS2659

: 0 410 894 028 EP type number

Governor

: RSV325...1175A0C2247 Governor design.

-1R

: 0 420 233 271 Governer no.

Customer—spec. information

Customer : MWM

Engine : TD224/ 4

1st version kW : 72.0 Rated speed : 2350

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening |

pressure, bar : 172...175

Test lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.95...3.05 Prestroke mm

: (2.90...3.10)

Rack travel in mm : 9.00...12.00 Firing order : 1-3-4-2

Phasing : 0<del>-9</del>0-180-270

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 9.00...0.00

& maximum rack tra: 21.00

Difference ° CS : 3.50...4.50

BASIC SETTING

rpm: 1175 1st speed

Rack travel in mm : 10.80...10.90

Del.quantity cm3/: 8.0...8.1

100 s: (7.8...8.3)

Spread cm3 : 0.3

100 s: (0.5)

2nd speed rpm : 325.0 Rack travel in mm : 7.0...7.2

Del.quantity cm3/: 0.8...1.4 100 s: (0.6...1.6)

cm3 : 0.2 100 s: (0.4) Spread

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800 Rack travel in mm: 0.30...0.70

Governor spring pre-tension Click setting x : 4.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1175 Speed Aneroid pressure h: 700

cm3 : 3.00 1000 : (5.00) Spread

RATED SPEED

1st version

Control lever

position degrees: 93...101

Testina: 1st rack travel in: 9.80 rpm : 1215...1225 2nd rack travel in: 4.00 rpm : 1250...1280 Speed 3rd rack travel in: 4.00 rpm : 1270...1300 Speed 4th rack travel in: 1430 Speed rpm : 0.30...1.40 LOW IDLE 1 Control lever position degrees: 64...72 Setting point w/out bumper spring rpm : 325 Rack travel in mm: 5.5 Testina: : 100 Speed rpm Minimum rack trave: 19.50 : 325 Speed rpm Rack travel in mm : 5.90...6.10 Rack travel in mm: 2.00 rpm : 480...540 Speed TORQUE CONTROL Torque control curve - 1st version rpm : 1175 1st speed Rack travel in m: 10.80...10.90 2nd speed rpm : 500 Rack travel in m: 11.70...11.80 4th speed rpm : 920 Rack travel in m: 11.20...11.40 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rom Pressure hPa : 700 Rack travel mm : 11.50...11.60 Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 10.70...10.80 2nd pressure hPa : 310
Rack travel in m: 11.20...11.30 FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 700

rpm : 750

Del.quantity cm3/: 81.0...83.0 1000 s: (78.5...85.5) Aneroid pressure h: 230 Speed rpm: 600 Del.quantity cm3/: 72.5...74.5 1000 s: (70.0...77.0) Aneroid pressure h: -Speed rpm: 500 Del.quantity cm3/: 63.0...64.0 1000 s: (61.0...66.0)

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 9.80 Speed rpm : 1215...1225

STARTING FUEL DELIVERY

Remarks:

: RENAULT

APPLICATION

Tractor (tractor engines)

Speed

Note remarks

Test sheet : KHD 6.1 a11 : 08.06.90 Edition

Replaces

: ISO-4113 Test oil

: 0 400 866 083 Combination no.

Injection pump

Pump designation: PES6A85D41D/3RS2532

EP type number : 0 410 886 909

Governor

: RSV325...1400A8C674-Governor design.

: 0 420 232 544 Governer no.

Customer-spec. information Customer : KHD

: BF6L913 Engine

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

pressure, bar : 172...175

: 1 680 750 014 Test lines

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 1.90...2.00

: (1.85...2.05)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6Phasing : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

BASIC SETTING

1st speed rpm: 1250

Rack travel in mm : 12.40...12.50

Del.quantity cm3/: 8.3...8.4

100 s: (8.1...8.6)

cm3 : 0.3Spread

100 s: (0.4)

rpm : 325.0 2nd speed Rack travel in mm: 6.6...6.8 Del.quantity cm3/: 0.9...1.5 100 s: (0.7...1.7)

cm3 : 0.2 100 s: (0.4) Spread

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

rpm : 800

Rack travel in mm : 0.70...1.00

Governor spring pre-tension

Click setting x : ?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1250 Speed Aneroid pressure h: 500

: 83.5...84.5 Del quantity 1000 : (81.5...86.5)

: 3.00 cm3 Spread

1000 : (4.50)

RATED SPEED

1st version Control lever

position degrees: 67...75

Testing:

1st rack travel in: 11.40 Speed rpm : 1440...1450

2nd rack travel in: 4.00

rpm : 1485...1515 Speed

4th rack travel in: 1620

rpm : 0.30...1.70Speed

LOW IDLE 1 Control Lever position degrees: 17...25 Setting point w/out bumper spring : 325 rpm Rack travel in mm: 6.2 Testing: rpm : 100 Speed Minimum rack trave: 19.00 Speed rpm : 325 Rack travel in mm : 6.60...6.80 Rack travel in mm : 2.00 Speed : 585...645 rpm : 700 Speed rpm Maximum rack trave: 1.00 TORQUE CONTROL rpm : 500 2nd speed Rack travel in m: 13.70...13.80 rpm : 1000 3rd speed Rack travel in m: 13.30...13.50 4th speed rpm : 1400 Rack travel in m: 12.40...12.50 Aneroid/Altitude Compensator Test 1st version Settina Speed : 500 rpm hPa : 700 Pressure : 13.70...13.80 Rack travel mm Measurement 1/min: 500 Speed 1st pressure hPa : 375 Rack travel in m: 13.40...13.50 2nd pressure hPa : 160 Rack travel in m: 12.30...12.60 3rd pressure hPa : -Rack travel in m: 11.80...11.90 FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 60.0...63.0 1000 s: (58.0...65.0) cm3 : -Spread 1000 s: (5.50) BREAKAWAY

1mm rack travel less than

full load rack tr: 11.40
Speed rpm: 1440...1450

STARTING FUEL DELIVERY

Speed rpm: 100
Rack travel in mm: 17.60...18.20

LOW IDLE

Speed rpm: 325
Rack travel in mm: 6.60...6.80
Del.quantity cm3/: 9.0...15.0
1000 s: (7.0...17.0)
Spread cm3: 2.00
1000 s: (4.00)

Remarks:

:

H07

1st version

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks : KHD 1 g 46 : 17.05.90 Test sheet Edition Replaces Test oil : ISO-4113 : 0 400 866 111 Combination no. Injection pump Pump designation : PES6A85D410/3RS2611 : 0 410 886 902 EP type number Governor Governor design. : RSV325...1200A0c2148 Governer no. : 0 420 232 293 Customer spec. information : KHD Customer : F6L913 Engine 1st version kW : 85.0 : 2400 Rated speed TEST BENCH REQUIREMENTS Test oil inlet temp. °C : 38...42 Overflow valve : 1 417 413 000 Inlet press., bar: 1.50 Test nozzle holder : 0 681 343 009 assembly **Opening** : 172...175 pressure, bar : 1 680 750 014 Test lines Outside diameter x Wall thickness : 6.00x2.00x600 x Length mm (A) Injection pump setting values Insp. values in parentheses

Set equal delivery quant. per values BEGINNING OF DELIVERY Test pressure, bar: 25...27 Prestroke mm : 2.50...2.60 : (2.45...2.65) H08

Rack travel in mm : 9.00...12.00 : 1-5-3-6-2-4 Firina order : 0-60-120-180-240-300 Phasing Tolerance + - ° : 0.50 (0.75) BASIC SETTING rpm: 1200 1st speed Rack travel in mm : 10.40...10.50 Del.quantity cm3/: 6.1...6.2 100 s: (5.9...6.4) cm3 : 0.3Spread 100 s: (0.5) rpm : 325.0 2nd speed Rack travel in mm: 8.4...8.6 Del.quantity cm3/: 0.8...1.4 100 s: (0.6...1.6) cm3 : 0.2Spread 100 s: (0.4) GUIDE SLEEVE POSITION Control-lever position Degree: -3 rpm : 800 Rack travel in mm : 0.30...0.70 Governor spring pre-tension Click setting x : 4.00FULL LOAD DELIV. AT FULL LOAD STOP 1st version rpm : 1200 Speed : 61.5...62.5 Del.quantity 1000 : (59.5...64.5) : 3.00 cm3 Spread 1000 : (5,00) RATED SPEED 1st version Control lever position degrees: 101...109 Testing: 1st rack travel in: 9.40 Speed rpm : 1240...1250 2nd rack travel in: 4.00 rpm : 1295...1325 Speed

4th rack travel in: 1460

rom : 0.30...1.40Speed LOW IDLE 1 Control lever position degrees: 76...84 Setting point w/out bumper spring rpm : 325 Speed Rack travel in mm: 8.5 : 325 Speed rpm Rack travel in mm: 8.40...8.60 Rack travel in mm: 2.00 Speed : 450...510 rpm SET IDLE AUXILIARY SPRING Rack travel in mm: 2.00 TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1200 Rack travel in m: 10.40...10.50 2nd speed rpm : 500 Rack travel in m: 11.10...11.30 4th speed rpm : 1000 Rack travel in m: 10.80...12.00 FUEL DELIVERY CHARACTERISTICS 1st version Speed rpm : 800 Del.quantity cm3/: 54.0...56.0 1000 s: (51.5...58.5) rpm : 1000 Speed Del.quantity cm3/: 60.0...62.0 1000 s: (57.5...64.5) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 9.40 rpm : 1240...1250 Speed STARTING FUEL DELIVERY Speed rpm : 100 Del.quantity cm3/: 100.0...110.0 1000 s: (97.0...113.0) Rack travel in mm : 16.90...17.30 Remarks: : DX6.30 **APPLICATION** 

Tractor (tractor engines)

#### Note remarks

: MWM 6,2 e 4 Test sheet : 31.08.90 : 21.4.89 Edition Replaces : ISO-4113 Test oil

Combination no. : 0 400 866 112

Injection pump

Pump designation: PES6A90D320/3RS2660

: 0 410 896 078 EP type number

Governor

: RSV325...1500A2C505-Governor design.

2R

: 0 420 233 196 Governer no.

Customer-spec. information · MLM Customer

: D226-6 Engine

: 110.0 1st version kW : 3000 Rated speed

## TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening |

: 172...175 pressure, bar

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.95...3.05 Prestroke mm

: (2.90...3.10)

Rack travel in mm : 9.00...12.00 Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance + - \* : 0.50 (0.75)

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50 & maximum rack tra: 21.00 Difference ° CS : 3.50...4.50

### BASIC SETTING

rpm: 1500 1st speed

Rack travel in mm : 11.20...11.30

Del.quantity cm3/: 8.9...9.0

100 s: (8.7...9.2)

cm3 : 0.3Spread

100 s: (0.5)

2nd speed rpm : 325.0 Rack travel in mm : 7.0...7.2

Del.quantity cm3/: 0.8...1.4

100 s: (0.6...1.6)

Spread cm3 : 0.2 100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 4.75

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1500 Speed

: 89.5...90.5 Del.quantity 1000 : (87.5...92.5)

: 3.00 Spread cm3 1900 : (5.00)

# RATED SPEED

1st version Control lever

position degrees: 109...117

Testing: 1st rack travel in: 10.20 rpm : 1540...1550 Speed 2nd rack travel in: 4.00 rpm : 1590...1620 Speed 3rd rack travel in: 4.00 rpm : 1605...1635 Speed 4th rack travel in: 1780 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 68...76 Setting point w/out bumper spring rpm : 325 Rack travel in mm: 6.6 Testing: Speed rpm : 100 Minimum rack trave: 19.50 Speed rpm : 325 Rack travel in mm : 7.00...7.20 Rack travel in mm : 2.00 Speed rpm : 450...510 TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1500 Rack travel in m: 11.20...11.30 2nd speed rpm : 500 Rack travel in m: 11.20...11.40 BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 10.20 rpm : 1540...1550 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 130.0...140.0 1000 s: (127.0...143.0) Rack travel in mm : 19.50...21.00 Remarks:

APPLICATION

Generator set

Note remarks

: MWM 6,2 e 6 Test sheet Edition : 21.05.90 : 18.12.87 Replaces Test oil : ISO-4113

Combination no. : 0 400 866 122

Injection pump

Pump designation : PES6A90D320/3RS2660

EP type number : 0 410 896 078

Governor

: RSV325...1200A0c2182 Governor design.

-3R

: 0 420 233 212 Governer no.

Customer-spec. information C PHYS Customer

: TD2268-6 Engine

1st version kW : 123.0 : 2400 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.00

Test nozzle holder

: 0 681 343 009 assembly

Openina

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.95...3.05 Prestroke mm

: (2.90...3.10)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

Phasina : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : -1

BEGINNING OF DELIVERY DIFFFRENCE

betw. rack trav. m: 8.50...9.50

& maximum rack tra: 21.00 Difference ° CS : 3.50...4.50

BASIC SETTING

1st speed rpm: 1180

Rack travel in mm : 11.60...11.70

Del.quantity cm3/: 8.9...9.0

100 s: (8.7...9.2)

Spread cm3 : 0.3

100 s: (0.4)

2nd speed rpm : 325.0
Rack travel in mm : 7.1...7.3
Del.quantity cm3/: 1.0...1.6

100 s: (0.8...1.8)

Spread cm3 : 0.2 100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

rpm : 800 Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting  $\bar{x}$ : 3.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1180 Speed

Aneroid pressure h: 700

: 89.0...90.0 Del.quantity 1000 : (87.0...92.0)

cm3 Spread : 3.00

1000 : (4.50)

RATED SPEED

1st version

Control Lever position degrees: 90...98 Testina: 1st rack travel in: 10.60 rpm : 1220...1230 Speed 2nd rack travel in: 4.00 : 1240...1270 Speed rpm 3rd rack travel in: 4.00 Speed rpm : 1260...1290 4th rack travel in: 1435 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 63...71 Setting point w/out bumper spring rpm : 325 Speed Rack travel in mm: 6.7 Testing: Speed : 100 rpm Minimum rack trave: 19.50 : 325 Speed rpm Rack travel in mm : 7.10...7.30 Rack travel in mm: 2.00 rpm : 485...545 Speed TORQUE CONTROL Torque control curve - 1st version rpm : 1180 1st speed Rack travel in m: 11.60...11.70 2nd speed rpm : 500 Rack travel in m: 12.40...12.50 rpm : 890 4th speed Rack travel in m: 12.00...12.20 Aneroid/Altitude Compensator Test 1st version Settina pm : 500 hPa : 700 Speed rom Pressure Rack travel mm : 12.40...12.50 Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 10.40...10.50 2nd pressure hPa : 400 Rack travel in m: 11.70...11.80 3rd pressure hPa : 210 Rack travel in m: 10.80...11.00 FUEL DELIVERY CHARACTERISTICS

1st version Aneroid pressure h: 700 Speed rpm : 600 Del.quantity cm3/: 92.0...94.0 1000 s: (89.5...96.5) Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 59.5...61.5 1000 s: (57.5...63.5) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 10.60 rpm : 1220...1230 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 128.0...138.0 1000 s: (125.0...141.0)

Rack travel in mm : 19.50...21.00

APPLICATION

Remarks:

Tractor (tractor engines)

Note remarks

Test sheet : KHD 6,1 r Edition : 17.05.90 Replaces : 3.11.89 Test oil : ISO-4113

Combination no. : 0 400 866 125

Injection pump

Pump designation : PES6A85D410/3RS2761

: 0 410 886 895 EP type number

Governor

: RSV325...1150A8C674-Governor design.

11

: 0 420 232 518 Governer no.

Customer-spec. information : KHD Customer

: BF6L913 Engine

: 112.0 1st version kW : 2300 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Openina

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.50...2.60 Prestroke mm

: (2.45...2.65)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

1st speed rpm: 1150

Rack travel in mm : 12.10...12.20

Del.quantity cm3/: 8.4...8.5

100 s: (8.2...8.7)

cm3 : 0.3Spread

100 s: (0.5)

rpm : 325.02nd speed Rack travel in mm : 7.5...7.7

Del.quantity cm3/: 0.9...1.5

100 s: (0.7...1.7)

cm3 : 0.2Spread 100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

rpm : 800 Speed Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 4.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm: 1150 Aneroid pressure h: 700

: 84.5...85.5 Del.quantity 1000 : (82.5...87.5)

: 3.00 Spread cm3

1000 : (5.00)

RATED SPEED

1st version Control lever

position degrees: 98...106

Testina:

1st rack travel in: 11.10 Speed rpm : 1190...1200

2nd rack travel in: 4.00

rpm : 1225...1255 Speed

3rd rack travel in: 4.00 Speed rpm : 1240...1270 4th rack travel in: 1410 Speed rpm : 0.30...1.40 LOW IDLE 1 Control lever position degrees: 63...71 Setting point w/out bumper spring Speed rpm : 325 Rack travel in mm : 7.1 Testing: rpm : 100 Speed Minimum rack trave: 19.50 : 325 Speed rpm Rack travel in mm : 7.50...7.70 Rack travel in mm : 2.00 rom : 430...490 Speed TORQUE CONTROL Torque control curve - 1st version rpm : 1150 1st speed Rack travel in m: 12.10...12.20 2nd speed rpm : 500 Rack travel in m: 12.60...12.70 3rd speed rpm : 855 Rack travel in m: 12.30...12.50 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm hPa : -Pressure : 11.50...11.60 Rack travel mm Measurement 1/min: 500 Speed 1st pressure hPa : 350 Rack travel in m: 11.90...12.00 3rd pressure hPa : 700 Rack travel in m: 12.60...12.70 FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 700 rpm : 750 Speed Del.quantity cm3/: 87.0...89.0 1000 s: (84.5...91.5) Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 64.5...65.5 1000 s: (62.5...67.5)

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 11.10

Speed rom : 1190...1200

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 110.0...120.0 1000 s: (107.0...123.0) Rack travel in mm : 17.00...17.40

Remarks:

H15

Note remarks

Test sheet : KHD 6,1 r 1 : 17.05.90 Edition Replaces : 3.11.89 Test oil : ISO-4113

Combination no. : 0 400 866 126

Injection pump

Pump designation: PES6A85D410/3RS2761

EP type number : 0 410 886 895

Governor

: RSV325...1150A8C673-Governor design.

: 0 420 232 519 Governer no.

Customer-spec. information Customer : KHD

Engine : BF6L913

: 112.0 1st version kW : 2300 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

**Openina** 

pressure, bar : 172...175

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.50...2.60 Prestroke mm

: (2.45...2.65)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

rpm: 1150 1st speed

Rack travel in mm : 12.10...12.20

Del.quantity cm3/: 8.4...8.5

100 s: (8.2...8.7)

Spread cm3 : 0.3

100 s: (0.5)

2nd speed rpm : 325.0 Rack travel in mm : 7.5...7.7 Del.quantity cm3/: 0.9...1.5

100 s: (0.7...1.7)

cm3 : 0.2Spread 100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 4.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed : 1150 rpm

: 84.5...85.5 : (82.5...87.5) Del.quantity 1000

: 3.00 Spread cm3

1000 : (5.00)

RATED SPEED

1st version Control lever

position degrees: 98...106

Testing:

1st rack travel in: 11.10

rpm : 1190...1200 Speed

2nd rack travel in: 4.00

Speed rpm : 1225...1255

3rd rack travel in: 4.00

Speed rpm : 1240...1270 4th rack travel in: 1410 rpm : 0.30...1.40 Speed LOW IDLE 1 Control Lever position degrees: 63...71 Setting point w/out bumper spring Speed rpm : 325 Rack travel in mm : 7.1 Testing: rpm : 100 Speed Minimum rack trave: 19.50 Speed rpm : 325
Rack travel in mm : 7.50...7.70
Rack travel in mm : 2.00 rpm : 430...490 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1150 Rack travel in m: 12.10...12.20 2nd speed rpm : 500 Rack travel in m: 12.60...12.70 3rd speed rpm : 855 Rack travel in m: 12.30...12.50 FUEL DELIVERY CHARACTERISTICS 1st version rpm : 750 Speed Del.quantity cm3/: 87.0...89.0 1000 s: (84.5...91.5) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 11.10 Speed rpm : 1190...1200 STARTING FUEL DELIVERY Speed rpm : 100 Del.quantity cm3/: 110.0...120.0

1000 s: (107.0...123.0) Rack travel in mm: 17.00...17.40

Remarks:

: ORENSTEIN U. KOPPEL

BOSCH INJ. PUMP TEST SPECIFICATIONS Rack travel in mm : 9.00...12.00 : 1-5-3-6-2-4 Firing order Note remarks Test sheet : KHD 6,1 r 2 : 17.05.90 : 0-60-120-180-240-300 Edition Phasing : 3.11.89 Replaces Test oil Tolerance + - ° : 0.50 (0.75) : ISO-4113 Combination no. : 0 400 866 127 BASIC SETTING 1st speed rpm: 1150 Injection pump Pump designation: PES6A85D410/3RS2761 Rack travel in mm : 12.10...12.20 EP type number : 0 410 886 895 Governor : RSV325...1150A8C707-Del.quantity cm3/: 8.4...8.5 Governor design. 100 s: (8.2...8.7) Governer no. : 0 420 232 517 Customer-spec. information Spread cm3 : 0.3Customer : KHD 100 s: (0.5) : BF6L913 Engine 2nd speed rpm : 325.0 Rack travel in mm : 7.5...7.7 1st version kW : 112.0 Rated speed : 2300 Del.guantity cm3/: 0.9...1.5 100 s: (0.7...1.7) TEST BENCH REQUIREMENTS Spread cm3 : 0.2100 s: (0.4) Test oil inlet temp. °C : 38...42 GUIDE SLEEVE POSITION Control-lever position Overflow valve Degree: -3 : 1 417 413 000 rpm : 800 Speed Rack travel in mm : 0.30...0.70 Inlet press., bar: 1.50 Governor spring pre-tension Test nozzle holder Click setting x : 4.00 : 0 681 343 009 assembly FULL LOAD DELIV. AT FULL LOAD STOP Opening pressure, bar : 172...175 1st version Speed rpm : 1150 Aneroid pressure h: 700 : 84.5...85.5 Test lines : 1 680 750 014 Del.quantity 1000 : (82.5...87.5) Outside diameter : 3.00 Spread cm3 x Wall thickness 1000 : (5.00) x Length mm : 6.00x2.00x600 RATED SPEED

(A) Injection pump setting values Insp. values in parentheses 1st version Set equal delivery quant. Control lever position degrees: 98...106 per values BEGINNING OF DELIVERY Testina: Test pressure, bar: 25...27 1st rack travel in: 11.10 Speed rpm : 1190...1200 : 2.50...2.60 Prestroke mm 2nd rack travel in: 4.00 rpm : 1225...1255

Speed

: (2.45...2.65)

3rd rack travel in: 4.00 Speed rpm : 1240...1270 4th rack travel in: 1410 Speed rpm : 0.30...1.40 LOW IDLE 1 Control lever position degrees: 63...71 Setting point w/out bumper spring Speed rpm : 325 Rack travel in mm : 7.1 Testina: : 100 Speed rpm Minimum rack trave: 19.50 Speed rpm: 325
Rack travel in mm: 7.50...7.70
Rack travel in mm: 2.00 : 430...490 Speed rom TORQUE CONTROL Torque control curve - 1st version rpm : 1150 1st speed Rack travel in m: 12.10...12.20 and speed rpm : 500
Rack travel in m: 12.60...12.70 2nd speed rpm : 855 3rd speed Rack travel in m: 12.30...12.50 Aneroid/Altitude Compensator Test 1st version Settina : 500 Speed rpm Pressure hPa : 11.50...11.60 Rack travel mm Measurement 1/min: 500 Speed 1st pressure hPa : 350 Rack travel in m: 11.90...12.00 3rd pressure hPa : 700 Rack travel in m: 12.60...12.70 FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 700 Speed rpm : 750 Del.quantity cm3/: 87.0...89.0 1000 s: (84.5...91.5) Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 64.5...65.5 1000 s: (62.5...67.5)

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 11.10 Speed rpm : 1190...1200

STARTING FUEL DELIVERY

Speed rpm: 100

Del.quantity cm3/: 110.0...120.0 1000 s: (107.0...123.0)

Rack travel in mm : 17.00...17.40

Remarks:

: VIBROMAX

Note remarks

: CUM 8,3 L 3 : 17.05.90 Test sheet Edition Replaces : 2.5.89 : ISO-4113 Test oil

Combination no. : 0 400 866 1290A

Injection pump

Pump designation: PES6A100D320/3RS2763

EP type number : 0 410 806 006

Governor

Governor design. : RSV400...1200A0C2190

: 0 420 233 Governer no.

: 3913290 Cust. part no.

Customer-spec. information Customer : C.D.C

Engine : 6 CT

: 101.0 1st version kW : 2400 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 017 assembly

**Opening** 

: 207...210 pressure, bar

Orifice plate

diameter mm : 0.6

: 1 680 750 014 Test lines

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

: 2.80...2.90 : (2.75...3.00) Prestroke mm

Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 1200 1st speed

Rack travel in mm : 10.00...10.10

Del.quantity cm3/: 8.7...8.9

100 s: (8.5...9.1)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 400.02nd speed

Rack travel in mm: 5.4...5.6 Del.quantity cm3/: 1.6...2.0

100 s: (1.3...2.2)

cm3 : 0.3Spread 100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x : ?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

: 1200 Speed rpm

: 87.5...89.5 Del.quantity

1000 : (85.5...91.5)

: 3.50 Spread cm3

1000 : (6.00)

RATED SPEED

1st version

Control lever

position degrees: 54...62

Testing: 1st rack travel in: 9.00 Speed rpm: 1240...1250 2nd rack travel in: 4.00 rpm : 1315...1345 Speed 3rd rack travel in: 4.00 rpm : 1315...1345 Speed 4th rack travel in: 1400 Speed rpm : 0.30...0.70 LOW IDLE 1 Control lever position degrees: 32...40 Setting point w/out bumper spring rpm : 400 Speed Rack travel in mm: 5.0 Testing: : 100 Speed וחסרו Minimum rack trave: 19.00 Speed rpm: 400 Rack travel in mm : 5.40...5.60 TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1200 Rack travel in m: 10.00...10.10 2nd speed rpm : 800 Rack travel in m: 10.40...10.60 FUEL DELIVERY CHARACTERISTICS 1st version Speed

1st version Speed rpm : 800 Del.quantity cm3/: 87.5...91.5 1000 s: (85.5...93.5)

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 9.00 Speed rpm : 1240...1250

STARTING FUEL DELIVERY

LOW IDLE

Speed rpm : 400 Rack travel in mm : 5.40...5.60 Del.quantity cm3/: 16.0...20.0 1000 s: (13.5...22.5) Spread cm3 : 3.50 1000 s: (5.50)

Remarks:

Adjust stop lever to 0.5...1.0 mm before stop.

Start-of-delivery mark 11° cam angle after start of delivery cyl. 1

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks Test sheet : CUM 8,3 L 4 : 17.05.90 Edition : 2.5.89 Replaces : ISO-4113 Test oil Combination no. : 0 400 866 1290B Injection pump : 0 410 806 006 EP type number Governor : 0 420 233 Governer no. : 3915977 Cust. part no. Customer-spec. information : C.D.C Customer Engine : 6 CT : 101.0 1st version kW Rated speed : 2400 TEST BENCH REQUIREMENTS Test oil inlet temp. °C : 38...42 Overflow valve : 1 417 413 047 Inlet press., bar: 1.50 Test nozzle holder : 1 688 901 017 assembly **Opening** pressure, bar : 207...210 Orifice plate diameter mm : 0,6 Test lines : 1 680 750 014 Outside diameter x Wall thickness

Pump designation: PES6A100D320/3RS2763 Governor design. : RSV400...1200A0C2190 x Length mm : 6.00X2.00X600 (A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values

Test pressure, bar: 27...29 : 2.80...2.90 Prestroke mm : (2.75...3.00) Rack travel in mm: 10.50 : 1-5-3-6-2-4 Firing order : 0-60-120-180-240-300 Phasing Phasing Tolerance + - ° : 0.50 (0.75)Time to cyl. no. BASIC SETTING rpm: 1200 1st speed Rack travel in mm : 10.00...10.10 Del.quantity cm3/: 8.7...8.9 100 s: (8.5...9.1) cm3 : 0.3Spread 100 s: (0.6) rpm : 400.02nd speed Rack travel in mm : 5.4...5.6 Del.quantity cm3/ : 1.6...2.0 100 s: (1.3...2.2) cm3 : 0.3Spread 100 s: (0.5) GUIDE SLEEVE POSITION Control-Lever position Degree: -3 rpm : 800 Speed Rack travel in mm : 0.30...0.70 Governor spring pre-tension Click setting x : ? FULL LOAD DELIV. AT FULL LOAD STOP 1st version rpm : 1200 / : 87.5...89.5 10<u>0</u>0 : (85.5...91.5) Speed Del.quantity

: 3.50 Spread cm3 : (6.00) 1000

RATED SPEED

1st version Control lever

position degrees: 54...62

BEGINNING OF DELIVERY

Testing: 1st rack travel in: 9.00 rpm : 1240...1250 Speed 2nd rack travel in: 4.00 : 1315...1345 Speed rpm 3rd rack travel in: 4.00 rpm : 1315...1345 Speed 4th rack travel in: 1400 rpm : 0.30...0.70 Speed LOW IDLE 1 Control lever position degrees: 32...40 Setting point w/out bumper spring Speed rpm : 400 Rack travel in mm: 5.0 Testing: Speed man : 100 Minimum rack trave: 19.00 Speed rpm : 400 Rack travel in mm : 5.40...5.60 TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1200 Rack travel in m: 10.00...10.10 2nd speed rpm : 800 Rack travel in m: 10.40...10.60 FUEL DELIVERY CHARACTERISTICS 1st version : 800 Speed rpm Del.quantity cm3/: 87.5...91.5 1000 s: (85.5...93.5) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 9.00 Speed : 1240...1250 mon. STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 150.0...170.0 1000 s: (145.0...175.0) Rack travel in mm : 20.00...21.00 LOW IDLE

: 400

rpm Rack travel in mm : 5.40...5.60

Del.quantity cm3/: 16.0...20.0 1000 s: (13.5...22.5) : 3.50 cm3 Spread 1000 s: (5.50)

### Remarks:

Adjust stop lever to 0.5...1.0 mm before stop.

Start-of-delivery mark 11° cam angle after start of delivery cyl. 1

Speed

Note remarks

: CUM 8,3 L 5 Test sheet : 17.05.90 : 2.5.89 Edition Replaces Test oil : ISO-4113

: 0 400 866 12900 Combination no.

Injection pump

Pump designation : PES6A100D320/3RS2763

EP type number : 0 410 806 006

Governor

Governor design: : RSV425...1100AUC2190

: 0 420 233 Governer no.

Cust. part no. : 3915989

Customer-spec. information Customer : C.D.C

Engine : 6 CT

1st version kW : 127.0 : 2200 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 017 assembly

Opening |

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test Lines : 1 680 750 014

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

: 2.80...2.90 Prestroke mm : (2.75...3.00)

Rack travel in mm: 10.50

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1100

Rack travel in mm : 10.20...10.30

Del.quantity cm3/: 9.3...9.5

100 s: (9.1...9.7)

cm3 : 0.4Spread

100 s: (0.6)

2nd speed rpm : 425.0 Rack travel in mm : 5.0...5.2 Del.quantity cm3/ : 1.6...2.0

100 s: (1.3...2.2)

Spread cm3 : 0.6100 s: (0.8)

GUIDE SLEEVE POSITION Control-lever position Degree: -3

rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x : ?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1100 Speed

Speed Deliquantity 1000 : 93.5...95.5 : (91.5...97.5)

cm3 : 4.00 Spread

1000 : (6.50)

RATED SPEED

1st version

Control lever

position degrees: 45...53

Testing: 1st rack travel in: 9.20 rpm : 1140...1150 Speed 2nd rack travel in: 4.00 Speed rpm : 1200...1230 3rd rack travel in: 4.00 rpm : 1200...1230 Speed 4th rack travel in: 1250 Speed rpm : 0.30...0.70 LOW IDLE 1 Control Lever position degrees: 25...33 Setting point w/out bumper spring Speed rpm: 425 Rack travel in mm: 4.6 Testing: rpm : 100 Speed Minimum rack trave: 19.00 rpm : 425 Speed Rack travel in mm : 5.00...5.20 TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1100 Rack travel in m: 10.20...10.30 2nd speed rpm : 750 Rack travel in m: 12.00...12.20 FUEL DELIVERY CHARACTERISTICS 1st version Speed וחסרו

Del.quantity cm3/: 120.0...124.0 1000 s: (118.0...126.0)

## **BREAKAWAY**

1st version 1mm rack travel less than

full load rack tr: 9.20 rpm : 1140...1150 Speed

### STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/: 150.0...170.0 1000 s: (145.0...175.0) Rack travel in mm : 20.00...21.00

# LOW IDLE

Speed rpm : 425 Rack travel in mm : 5.00...5.20 Del.quantity cm3/: 16.0...20.0 1000 s: (13.5...22.5) cm3 : 6.00Spread

1000 s: (8.00)

### Remarks:

Adjust stop lever to 0.5...1.0 mm before stop.

Start-of-delivery mark 11° cam angle after start of delivery cyl. 1

Note remarks

: CUM 8,3 a63 : 09.07.90 Test sheet Edition : 2.5.89 Replaces : ISO-4113 Test oil

Combination no. : 0 400 866 132

Injection pump

Pump designation : PES6A100D320/3RS2691

: 9 410 230 025 EP type number

Governor

: RSV500...1250A0C2190 Governor design.

-28R

: 0 420 233 231 Governer no.

Customer-spec. information Customer : C.D.C.

: 6 CT-I 8.3ltr. Engine

: 139.0 : 2500 1st version kW Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

assembly : 1 688 901 017

Opening .

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 014

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

: 2.80...2.90 Prestroke mm

: (2.75...2.95)

Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rom: 1250

Rack travel in mm : 11.40...11.50

Del.guantity cm3/: 10.1...10.3

100 s: (9.9...10.5)

cm3 : 0.4Spread

100 s: (0.6)

rpm : 500.0 2nd speed Rack travel in mm : 5.5...5.7 Del.quantity cm3/ : 1.3...1.7 100 s: (1.0...1.9)

cm3 : 0.6Spread 100 s: (0.8)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 Speed rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x :?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Spread

rpm : 1250 Speed

: 101.5...103.5 Del.quantity 1000 : (99.5...105.5)

> : 4.00 cm3 1000 : (6.50)

RATED SPEED

1st version

Control lever

position degrees: 43...51

Testing:

1st rack travel in: 10.40 Speed rpm : 1315...1325 2nd rack travel in: 4.00 rpm : 1365...1375 Speed 3rd rack travel in: 4.00 rpm : 1365...1395 Speed 4th rack travel in: 1400 rpm : 0.30...1.40Speed LOW IDLE 1 Control lever position degrees: 19...27 Setting point w/out bumper spring rpm Rack travel in mm: 5.1 Testing: : 100 Speed rom Minimum rack trave: 19.00 : 500 Speed MC Rack travel in mm : 5.50...5.70 BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 10.40 rpm : 1315...1325 Speed STARTING FUEL DELIVERY Speed rpm : 100 Del.quantity cm3/ : 135.0...155.0 1000 s: (130.0...160.0) Rack travel in mm : 19.00...21.00 LOW IDLE : 500 Speed rpm Rack travel in mm : 5.50...5.70 Del.quantity cm3/ : 13.0...17.0 1000 s: (10.5...19.5) Spread cm3 : 6.001000 s: (8.00) Remarks: : C.D.C. # 3915687 Start-of-delivery mark 11° cam angle after start of delivery cyl. 1 Adjust stop lever to 0.5...1.0 mm

H27

before stop.

Note remarks

: CUM 8,3 a64 : 17.05.90 Test sheet Edition : 2.5.89 Replaces : ISO-4113 Test oil

Combination no. : 0 400 866 132LA

Injection pump

Pump designation : PES6A1000320/3RS2691

EP type number : 9 410 230 025

Governor

Governor design. : RSV400...1050A0C2190

: 9 420 234 Governer no.

Cust. part no. : 3915948

Customer—spec. information Customer : C.D.C.

: 6 C 8.3 Engine

1st version kW : 174.0 Rated speed : 2100

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 017 assembly

Opening

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

: 2.80...2.90 : (2.75...2.95) Prestroke mm

Rack travel in mm : 10.50

Firing order : 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Phasina

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm : 1050

Rack travel in mm : 12.90...13.00

Del.quantity cm3/: 12.9...13.1

100 s: (12.7...13.3)

Spread cm3 : 0.3

100 s: (0.6)

rpm : 400.0 2nd speed Rack travel in mm : 5.8...6.0

Del.guantity cm3/: 1.6...2.0 100 s: (1.3...2.2)

cm3 : 0.3 Spread

100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position Degree: -3

rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x :?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

: 1050 Speed rpm

: 129.0...131.0 Del.quantity 1000 : (127.0...133.0)

: 3.50 Spread cm3

1000 : (6.00)

RATED SPEED

1st version

Control lever

position degrees: 37...45

Testina: 1st rack travel in: 11.90 Speed rpm : 1095...1105 2nd rack travel in: 4.00 Speed rpm : 1170...1200 3rd rack travel in: 4.00 rpm : 1170...1200 Speed 4th rack travel in: 1250 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 18...26 Setting point w/out bumper spring rpm : 400 Speed Rack travel in mm: 5.4 Testing: rpm : 100 Speed Minimum rack trave: 19.00 rpm : 400 Rack travel in mm : 5.80...6.00 BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 11.90 rpm : 1095...1105 Speed STARTING FUEL DELIVERY : 100 Speed rom Del.quantity cm3/: 135.0...155.0 1000 s: (130.0...160.0) Rack travel in mm : 19.00...21.00 LOW IDLE Speed : 400 rpm Rack travel in mm : 5.80...6.00 Del.quantity cm3/: 16.0...20.0 1000 s: (13.5...22.5) Spread cm3: 3.50 1000 s: (5.50) Remarks: Adjust stop lever to 0.5...1.0 mm before stop. Start-of-delivery mark 11° cam angle

J01

after start of delivery cyl. 1

Note remarks

: CUM 5,9 v 2 Test sheet Edition : 31.07.90 Replaces : 24.5.89 Test oil : ISO-4113

: 0 400 866 143 Combination no.

Injection pump

Pump designation : PES6A95D12DRS2773 EP type number : 0 410 896 904

Governor

Governor design. : RSV350...1250A0C2237

: 0 420 233 240 Governer no.

Customer-spec. information Customer : CUMMINS

: 6BT Engine

1st version kW : 118.0 : 2500 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 017 assembly

Opening |

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

: 1 680 750 014 Test lines

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.10...2.20 : (2.05...2.25) Prestroke mm

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

BASIC SETTING

1st speed rpm: 1250

Rack travel in mm : 9.40...9.50

Del.quantity cm3/: 8.6...8.8

100 s: (8.3...9.0)

cm3 : 0.3 Spread

100 s: (0.6)

rpm:350.02nd speed Rack travel in mm: 6.1...6.3 Del.quantity cm3/: 1.0...1.6

100 s: (0.7...1.8)

cm3 : 0.3Spread 100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800 Rack travel in mm: 0.30...0.70

Governor spring pre-tension Click setting x : 3.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1250

Del.quantity : 86.0...88.0 1000 : (83.5...90.5)

: 3.50 Spread cm3

1000 : (6.00)

RATED SPEED

1st version

Control lever

position degrees: 91...99

Testing:

1st rack travel in: 8.40

rpm : 1290...1300 Speed

2nd rack travel in: 4.00 rpm : 1355...1385 Speed 3rd rack travel in: 4.00 Speed rpm : 1370...1400 4th rack travel in: 1530 Speed rpm : 0.30...1.40 LOW IDLE 1 Control lever position degrees: 70...78 Setting point w/out bumper spring Speed rpm : 350 Rack travel in mm : 5.0 Testing: Speed rpm : 100 Minimum rack trave: 19.50

Minimum rack trave: 19.50
Speed rpm: 350
Rack travel in mm: 5.40...5.60
Rack travel in mm: 2.00
Speed rpm: 465...525

TORQUE CONTROL

Torque control curve - 1st version

1st speed rpm : 1250

Rack travel in m: 9.40...9.50

2nd speed rpm : 500

Rack travel in m: 9.40...9.60

FUEL DELIVERY CHARACTERISTICS

1st version Speed rpm : 500 Del.quantity cm3/ : 69.5...72.5 1000 s: (67.5...74.5)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 8.40 Speed rpm : 1290...1300

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/: 107.0...117.0 1000 s: (104.0...120.0) Rack travel in mm : 14.10...14.50

LOW IDLE

Speed rpm : 350 Rack travel in mm : 6.10...6.30 Del.quantity cm3/ : 10.0...16.0 1000 s: (7.5...18.5) Spread cm3 : 3.50 1000 s: (5.50)

Remarks:

Start-of-delivery mark 11.5° cam angle after start of delivery cyl. 1

103

Note remarks

Test sheet : CUM 8,3 l10 Edition : 09.07.90 Replaces : 6.3.90

Test oil : ISO-4113

Combination no. : 0 400 866 148

Injection pump

Pump designation : PES6A100D320/3RS2763

EP type number : 0 410 806 006

Governor

Governor design. : RSV415...1175A0C2190

-43R

Governer no. : 0 420 233 249

Customer—spec. information Customer : C.D.C

Engine : 6 CT

1st version kW : 129.0 Rated speed : 2350

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

assembly : 1 688 901 017

Opening.

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test Lines : 1 680 750 014

Outside diameter

x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

Prestroke mm : 2.80...2.90 : (2.75...2.95)

Rack travel in mm : 10.50

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance  $+ - \circ : 0.50 (0.75)$ 

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1175

Rack travel in mm : 10.40...10.50

Del.quantity cm3/: 9.6...9.8

100 s: (9.4...10.0)

Spread cm3 : 0.4

100 s: (0.6)

2nd speed rpm : 415.0 Rack travel in mm : 5.1...5.3 Del.quantity cm3/ : 1.5...1.9

100 s: (1.3...2.1) Spread cm3 : 0.6

100 s: (0.8)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm : 800 Rack travel in mm : 0.30...0.70

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm: 1175

Del.quantity : 96.0...98.0

1000 : (94.0...100.0)

Spread cm3 : 4.00 1000 : (6.50)

RATED SPEED

1st version Control lever

position degrees: 56...64

Testing:

1st rack travel in: 9.40

Speed rpm : 1240...1250

2nd rack travel in: 4.00

Speed rpm : 1295...1325

3rd rack travel in: 4.00

Speed rpm : 1300...1330

4th rack travel in: 1350

Speed rpm : 0.30...0.70

LOW IDLE 1 Control lever

position degrees: 32...40
Setting point w/out bumper spring

Speed rpm : 415 Rack travel in mm : 4.7

Testing:

Speed rpm : 100 Minimum rack trave: 19.00 Speed rpm : 415

Rack travel in mm : 5.10...5.30

TORQUE CONTROL

Torque control curve - 1st version

1st speed rpm : 1175

Rack travel in m: 10.40...10.50

2nd speed rpm : 800

Rack travel in m: 10.70...10.90

FUEL DELIVERY CHARACTERISTICS

1st version

Speed rpm: 800

Del.quantity cm3/: 98.0...102.0

1000 s: (96.0...104.0)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 9.40

Speed rpm : 1240...1250

STARTING FUEL DELIVERY

Speed rpm: 100

Del.quantity cm3/: 145.0...165.0

1000 s: (140.0...170.0)

Rack travel in mm : 20.00...21.00

LOW IDLE

Speed rpm: 415

Rack travel in mm : 5.10...5.30 Del.quantity cm3/: 15.0...19.0

1000 s: (13.0...21.0)

Spread cm3 : 6.00

1000 s: (8.00)

Remarks:

: C.D.C. # 3919459

Adjust stop lever to 0.5...1.0 mm before stop.

Start-of-delivery mark 11° cam angle after start of delivery cyl. 1

Adjustment without torque-control spring retainer with 1 mm less control-rod travel. Increase in full-load delivery with torque-control spring retainer.

Note remarks

Test sheet

: CUM 8,3 L12 : 09.07.90

Edition Replaces

: 2.5.90

Test oil

: ISO-4113

Combination no. : 0 400 866 149

Injection pump

Pump designation : PES6A100D320/3RS2763

EP type number

: 0 410 806 006

Governor

Governor design.

: RSV375...1000A0c2190

-44R

Governer no.

: 0 420 233 250

Customer—spec. information Customer

: C.D.C.

Engine

: 6 CTA

1st version kW

: 166.0

Rated speed

: 2000

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C

: 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

assembly

: 1 688 901 017

Openina |

pressure, bar

: 207...210

Orifice plate

diameter mm

: 0,6

Test lines

: 1 680 750 014

Outside diameter

x Wall thickness

x Length mm

: 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

Prestroke mm : 2.80...2.90 : (2.75...2.95)
Rack travel in mm : 10.50

Firing order

: 1-5-3-6-2-4

Phasing

: 0-60-120-180-240-300

Tolerance + - °

: 0.50 (0.75)

Time to cyl. no.

BASIC SETTING

1st speed

rpm: 1000

: 1

Rack travel in mm : 12.90...13.00

Del.quantity cm3/: 13.2...13.4

100 s: (13.0...13.6)

Spread

cm3 : 0.4

100 s: (0.6)

2nd speed rpm : 375.0
Rack travel in mm : 5.3...5.5
Del.quantity cm3/ : 1.4...1.8
100 s: (1.2...2.0)

Spread

cm3 : 0.6100 s: (0.8)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x : ?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed

rpm : 1000

Del.quantity : 132.3...136.5)

Spread

: 4.00 cm3

1000 : (6.50)

RATED SPEED

1st version

Control lever

position degrees: 37...45

Testing:

1st rack travel in: 11.90

rpm : 1050...1060 Speed

2nd rack travel in: 4.00

Speed rpm: 1115...1145 3rd rack travel in: 4.00

rpm : 1120...1150 Speed

4th rack travel in: 1200

rpm : 0.30...1.40 Speed

LOW IDLE 1 Control Lever

position degrees: 15...23

Setting point w/out bumper spring

rpm Rack travel in mm: 4.9

Testina:

: 100 Speed rpm Minimum rack trave: 19.00 Speed : 375 rom

Rack travel in mm : 5.30...5.50

TORQUE CONTROL

Torque control curve - 1st version

rpm : 1000 1st speed

Rack travel in m: 12.90...13.00

2nd speed rpm : 750

Rack travel in m: 13.60...13.80

FUEL DELIVERY CHARACTERISTICS

1st version

: 750 Speed rpm

Del.quantity cm3/: 141.5...145.5 1000 s: (139.5...147.5)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 11.90

: 1050...1060 Speed rom

STARTING FUEL DELIVERY

: 100 Speed rpm

Del.quantity cm3/: 145.0...165.0 1000 s: (140.0...170.0)

Rack travel in mm : 20.00...21.00

LOW IDLE

Speed rom : 375

Rack travel in mm : 5.30...5.50 Del.quantity cm3/: 14.0...18.0 1000 s: (12.0...20.0)

Spread cm3 : 6.001000 s: (8.00)

Remarks:

: C.D.C. # 3915570

Adjustment without torque-control spring retainer with 1 mm less control-rod travel. Increase in full-load delivery with torque-control spring retainer.

Adjust stop lever to 0.5...1.0 mm before stop.

Start-of-delivery mark at 10° cam rotation angle after start of delivery, cylinder 1

Note remarks

: CUM 8,3 o Test sheet Edition : 09.07.90 : 1.2.90 Replaces : ISO-4113 Test oil

: 0 400 866 151

Injection pump

Combination no.

Pump designation: PES6A1000320/3RS2691

: 9 410 230 030 EP type number

Governor

: RSV450...1100A0C2238 Governor design.

: 0 420 233 254 Governer no.

Customer-spec. information Customer : C.D.C.

Engine : 6CT830

1st version kW : 151.0 : 2200 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 017 assembly

Opening |

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

: 2.80...2.90 : (2.75...2.95) Prestroke mm

Rack travel in mm: 10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasina

Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1100

Rack travel in mm : 12.10...12.20

Del.quantity cm3/: 11.8...12.0

100 s: (11.6...12.2)

cm3 : 0.4Spread

100 s: (0.6)

rpm : 450.0 2nd speed

Rack travel in mm : 5.7...5.9 Del.quantity cm3/: 1.6...2.0

100 s: (1.3...2.2)

cm3 : 0.6Spread

100 s: (0.8)

GUIDE SLEEVE POSITION

Control-lever position

Degree: -3 rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x : ?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rom : 1100 Aneroid pressure h: 900

: 118.5...120.5 Del.quantity

1000 : (116.5...122.5)

: 4.00 Spread cm3

1000 : (6.50)

RATED SPEED

1st version Control lever

position degrees: 42...50

Testing: 1st rack travel in: 11.10 rpm : 1140...1150 Speed 2nd rack travel in: 4.00 Speed rpm : 1190...1220 3rd rack travel in: 4.00 Speed rpm : 1195...1225 4th rack travel in: 1300 rpm : 0.30...1.40 Speed LOW IDLE 1 Control Lever position degrees: 22...30 Setting point w/out bumper spring rpm : 450 Speed Rack travel in mm : 5.3 Testina: Speed rpm: Minimum rack trave: 19.00 rpm : 450 Speed Rack travel in mm : 5.70...5.90 TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1100 Rack travel in m: 12.10...12.20 2nd speed rpm : 750 Rack travel in m: 13.10...13.30 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm hPa : 900 Pressure Rack travel mm : 13.10...13.30 Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 10.40...10.60 2nd pressure hPa : 385
Rack travel in m: 11.40...11.50
3rd pressure hPa : 560
Rack travel in m: 12.60...13.00

FUEL DELIVERY CHARACTERISTICS

Speed rpm: 750
Del.quantity cm3/: 133.0...137.0
1000 s: (131.0...139.0)

Aneroid pressure h: 900

Aneroid pressure h: -

Speed rpm : 500 Del.quantity cm3/ : 78.0...80.0 1000 s: (76.0...82.0)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 11.10 Speed rpm : 1140...1150

STARTING FUEL DELIVERY

LOW IDLE

Speed rpm : 450
Rack travel in mm : 5.70...5.90
Del.quantity cm3/ : 16.0...20.0
1000 s: (13.5...22.5)

Spread cm3 : 6.00 1000 s: (8.00)

Remarks:

: C.D.C. # 3915996

Adjustment without torque-control spring retainer with 1 mm less control-rod travel. Increase in full-load delivery with torque-control spring retainer.

Start-of-delivery mark 11° cam angle after start of delivery cyl. 1

Adjust stop lever to 0.5...1.0 mm before stop.

1st version

BOSCH INJ. PUMP TEST SPECIFICATIONS Prestroke mm : 2.10...2.20 : (2.05...2.25)
Rack travel in mm : 9.00...12.00 Note remarks : 1-5-3-6-2-4 Test sheet : CUM 5,9 v 1 Firing order Edition : 31.07.90 Replaces : 20.10.89 : ISO-4113 Test oil : 0-60-120-180-240-300 Phasing Combination no. : 0 400 866 157 Tolerance + - ° : 0.50 (0.75) Injection pump Pump designation : PES6A95D12ORS2773 BASIC SETTING : 0 410 896 904 EP type number rpm: 1300 1st speed Governor : RSV350...1300A0C2237 Governor design. Rack travel in mm : 8.10...8.20 -1R : 0 420 233 260 Governer no. Del.guantity cm3/ : 7.5...7.7 Customer-spec. information 100 s: (7.2...7.9) : CUMMINS Customer : 6BT 5.9 cm3 : 0.3Engine Spread : 108.0 100 s: (0.6) 1st version kW Rated speed : 2600 2nd speed rpm : 350.0 Rack travel in mm : 5.9...6.1 Del.quantity cm3/ : 1.0...1.6 100 s: (0.7...1.8) TEST BENCH REQUIREMENTS Test oil inlet temp. °C : 38...42 Spread cm3 : 0.3100 s: (0.5) Overflow valve : 1 417 413 000 GUIDE SLEEVE POSITION Control-lever position Degree: -3 Inlet press., bar: 1.50 rpm : 800 Speed Rack travel in mm : 0.30...0.70 Test nozzle holder : 1 688 901 017 assembly Governor spring pre-tension Click setting x : 4.50 **Opening** : 207...210 pressure, bar FULL LOAD DELIV. AT FULL LOAD STOP Orifice plate 1st version diameter mm : 0,6 Speed rpm : 1300 : 75.0...77.0 Del.quantity : (72.5...79.5) : 3.50 : 1 680 750 014 1000 Test Lines cm3 Spread 1000 : (6.00) Outside diameter x Wall thickness : 6.00X2.00X600 RATED SPEED x Length mm 1st version (A) Injection pump setting values Insp. values in parentheses Control lever Set equal delivery quant. position degrees: 95...103 per values Testing: BEGINNING OF DELIVERY 1st rack travel in: 7.10

rpm : 1340...1350

Speed

Test pressure, bar: 25...27

2nd rack travel in: 4.00 rpm : 1405...1435 Speed 3rd rack travel in: 4.00 rpm : 1410...1440 Speed 4th rack travel in: 1550 rpm : 0.30...1.40 Speed LOW IDLE 1 Control Lever position degrees: 76...84 Setting point w/out bumper spring Speed rpm : 350 Rack travel in mm : 5.5 Testing: rpm : 100 Speed Minimum rack trave: 19.50 rpm : 350 Rack travel in mm : 5.90...6.10 Rack travel in mm : 2.00 rpm : 520...580 Speed TORQUE CONTROL Dimension a mm : 0.35 Torque control curve - 1st version 1st speed rpm : 1300 Rack travel in m: 8.10...8.20 rpm : 500 2nd speed Rack travel in m: 8.50...8.60 3rd speed rpm : 940 Rack travel in m: 8.30...8.50 FUEL DELIVERY CHARACTERISTICS 1st version : 500 Speed rpm Del.quantity cm3/: 56.0...59.0 1000 s: (54.0...61.0) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 7.10 rpm : 1340...1350 Speed STARTING FUEL DELIVERY Speed : 100 rom Del.quantity cm3/: 100.0...110.0 1000 s: (97.0...113.0) Rack travel in mm : 13.00...13.20

rpm : 350

Rack travel in mm : 5.90...6.10 Del.quantity cm3/: 10.0...16.0 1000 s: (7.5...18.5) Spread cm3: 3.50 1000 s: (5.50) Remarks: Start-of-delivery mark 11.5° cam angle after start of delivery cyl. 1

J11

Speed

LOW IDLE

Note remarks

: CUM 8,3 a77 : 08.06.90 Test sheet Edition : 6.3.90 Replaces : ISO-4113 Test oil

: 0 400 866 160 Combination no.

Injection pump

Pump designation : PES6A1000320/3RS2691

EP type number : 9 410 230 025

Governor

: RSV470...1100A0c2190 Governor design.

-48R

: 0 420 233 262 Governer no.

Customer-spec. information Customer : C.D.C.

: 6CT830 Engine

1st version kW : 150.6 : 2200 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 017 assembly

Opening

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 014

Outside diameter

x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

: 2.80...2.90 Prestroke mm : (2.75...2.95)

Rack travel in mm : 10.50 Firing order : 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 1100 1st speed

Rack travel in mm : 12.10...12.20

Del.guantity cm3/: 11.4...11.6

100 s: (11.2...11.8)

Spread cm3 : 0.4

100 s: (0.6)

rpm : 470.0 2nd speed

Rack travel in mm : 5.7...5.9 Del.quantity cm3/ : 1.6...2.0 100 s: (1.3...2.2)

cm3 : 0.6Spread 100 s: (0.8)

GUIDE SLEEVE POSITION Control-lever position Degree: -3

Speed rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 4.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

: 1100 Speed rom

: 114.0...116.0 Del.quantity

1000 : (112.0...118.0)

cm3 : 4.00 Spread

1000 : (6.50)

RATED SPEED

1st version

Control lever

position degrees: 44...52

Testina:

1st rack travel in: 11.10

rpm : 1140...1150

2nd rack travel in: 4.00

rpm : 1205...1235 Speed

3rd rack travel in: 4.00

Speed rpm : 1210...1240 4th rack travel in: 1300 rpm : 0.30...1.40 Speed

LOW IDLE 1 Control lever

position degrees: 26...34

Setting point w/out bumper spring

rpm : 470 Rack travel in mm: 5.3

Testing:

Speed rpm : 100 Minimum rack trave: 19.00 rpm : 470

Rack travel in mm : 5.70...5.90

TORQUE CONTROL

Torque control curve - 1st version

1st speed rpm : 1100

Rack travel in m: 12.10...12.20 2nd speed rpm : 750

Rack travel in m: 12.40...12.60

FUEL DELIVERY CHARACTERISTICS

1st version

Speed rpm : 750

Del.quantity cm3/: 116.0...120.0

1000 s: (114.0...122.0)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 11.10

rpm : 1140...1150 Speed

STARTING FUEL DELIVERY

Speed rpm : 100

Del.quantity cm3/: 125.0...145.0 1000 s: (120.0...150.0) Rack travel in mm: 20.00...21.00

LOW IDLE

rpm : 470 Speed

Rack travel in mm : 5.70...5.90 Del.quantity cm3/ : 16.0...20.0 1000 s: (13.5...22.5)

cm3 : 6.00 Spread 1000 s: (8.00)

Remarks:

: C.D.C. # 3917962

Adjustment without torque-control spring retainer with 1 mm less control-rod travel. Increase in full-load delivery with torque-control spring retainer.

Start-of-delivery mark 11° cam angle after start of delivery cyl. 1

Adjust stop lever to 0.5...1.0 mm before stop.

Note remarks

: CUM 8,3 a78 Test sheet Edition : 09.07.90 : 2.5.90 Replaces : ISO-4113 Test oil

Combination no. : 0 400 866 161

Injection pump

Pump designation : PES6A100D320/3RS2691

: 9 410 230 025 EP type number

Governor

: RSV400...1000A0C2190 Governor design.

-49R

: 0 420 233 263 Governer no.

Customer-spec. information Customer : C.D.C.

: 6 CT 8.3 Engine

: 151.4 1st version kW Rated speed : 2000

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 047

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 017 assembly

Opening

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

: 1 680 750 014 Test Lines

Outside diameter x Wall thickness

x Lenath mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

: 2.80...2.90 : (2.75...2.95) Prestroke mm

Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1000

Rack travel in mm : 12.10...12.20

Del.quantity cm3/: 11.9...12.1

100 s: (11.7...12.3)

Spread cm3 : 0.4

100 s: (0.6)

rpm : 400.0 2nd speed Rack travel in mm : 5.6...5.8 Del.quantity cm3/ : 1.6...2.0

100 s: (1.3...2.2)

cm3 : 0.6Spread

100 s: (0.8)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800 Rack travel in mm: 0.30...0.70

Governor spring pre-tension Click setting x : 4.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1000

: 119.0...121.0 Del.quantity 1000 : (117.0...123.0)

: 4.00 cm3

Spread 1000 : (6.50)

RATED SPEED

1st version

Control lever

position degrees: 36...44

Testing:

1st rack travel in: 11.10 rpm : 1050...1060 Speed 2nd rack travel in: 4.00 rpm : 1100...1130 Speed 3rd rack travel in: 4.00 rpm : 1105...1135 Speed 4th rack travel in: 1175 Speed rpm : 0.30...1.40 LOW IDLE 1 Control lever position degrees: 21...29 Setting point w/out bumper spring rpm : 400 Rack travel in mm: 5.2 Testing: Speed rpm : 100 Minimum rack trave: 19.00 : 400 Speed rpm Rack travel in mm : 5.60...5.80 **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 11.10 rpm : 1050...1060 Speed STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 135.0...155.0 1000 s: (130.0...160.0) Rack travel in mm : 19.00...21.00 LOW IDLE Speed : 400 rom Rack travel in mm : 5.60...5.80 Del.quantity cm3/ : 16.0...20.0 1000 s: (13.5...22.5) Spread cm3 : 6.001000 s: (8.00) Remarks: : C.D.C. # 3915963 Adjust stop lever to 0.5...1.0 mm

before stop.

Start-of-delivery mark at 10° cam rotation angle after start of delivery, cylinder 1

Note remarks

: MWM 6,2 e 8 Test sheet Edition : 31.07.90

Replaces

Test oil : ISO-4113

: 0 400 866 163 Combination no.

Injection pump

Pump designation : PES6A90D320/3RS2660

: 0 410 896 078 EP type number

Governor

Governor design. : RSV325...1175A0C2247

: 0 420 233 264 Governer no.

Customer—spec. information

Customer : MWM

Engine : TD226B-6

: 107.0 1st version kW : 2350 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

pressure, bar : 172...175

: 1 680 750 014 Test lines

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.95...3.05 Prestroke mm

: (2.90...3.10)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : -1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50

& maximum rack tra: 21.00

Difference ° CS : 3.50...4.50

BASIC SETTING

rpm: 1175 1st speed

Rack travel in mm : 10.30...10.40

Del.quantity cm3/ : 7.6...7.7

100 s: (7.4...7.9)

Spread cm3 : 0.3

100 s: (0.5)

rpm : 325.0 2nd speed

Rack travel in mm: 6.7...6.9 Del.quantity cm3/: 1.0...1.6

100 s: (0.8...1.8)

cm3 : 0.2

100 s: (0.4)

GUIDE SLEEVE POSITION

Control-lever position Degree: -3

rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x : 3.75

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Spread

Speed rpm: 1175 Aneroid pressure h: 700

: 76.0...77.0 Del.quantity 1000 : (74.0...79.0)

: 3.00 Spread cm3 1000 : (5.00)

RATED SPEED

1st version

Control lever position degrees: 92...100 Testina: 1st rack travel in: 9.30 rpm : 1215...1225 Speed 2nd rack travel in: 4.00 rpm : 1240...1270 Speed 3rd rack travel in: 4.50 rpm : 1255...1285 Speed 4th rack travel in: 1430 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 65...73 Setting point w/out bumper spring rpm Rack travel in mm: 5.7 Testina: Speed rpm Minimum rack trave: 19.50 : 325 Speed rpm -Rack travel in mm : 6.10...6.30 Rack travel in mm : 2.00 Speed : 485...555 rom TORQUE CONTROL Torque control curve - 1st version rpm : 1175 1st speed Rack travel in m: 10.30...10.40 rpm : 500 2nd speed Rack travel in m: 11.40...11.50 4th speed rpm : 880 Rack travel in m: 10.80...11.00 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm. hPa : 700 Pressure Rack travel mm : 11.40...11.50 Measurement  $1/\min : 500$ Speed 1st pressure hPa : -Rack travel in m: 10.20...10.30 2nd pressure hPa : 275 Rack travel in m: 11.00...11.10 3rd pressure hPa : 210 Rack travel in m: 10.50...10.70 FUEL DELIVERY CHARACTERISTICS

#### BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 9.30 Speed rpm : 1215...1225

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 130.0...140.0 1000 s: (127.0...143.0) Rack trayel in mm : 19.50...21.00

Remarks:

: RENAULT

APPLICATION

Tractor (tractor engines)

Note remarks

Test sheet : MWM 6,2 e 9 Edition : 29.06.90

Replaces

: ISO-4113 Test oil

Combination no. : 0 400 866 164

Injection pump

Pump designation : PES6A90D320/3RS2660

EP type number : 0 410 896 078

Governor

Governor design. : RSV325...1200A0C2249

: 0 420 233 265 Governer no.

Customer spec. information Customer : MWM

: TD2268-6 Engine

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening |

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm

: 2.95...3.05 : (2.90...3.10)

Rack travel in mm : 9.00...12.00 : 1-5-3-6-2-Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : -1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50

& maximum rack tra: 21.00

Difference ° CS : 3.50...4.50

BASIC SETTING

rpm: 1200 1st speed

Rack travel in mm : 10.30...10.40

Del.quantity cm3/: 7.6...7.7

100 s: (7.4...7.9)

Spread cm3 : 0.3

100 s: (0.5)

2nd speed rpm : 325.0 Del.quantity cm3/: 1.0...1.6

100 s: (0.8...1.8)

cm3 : 0.2 Spread

100 s: (0.4)

GUIDE SLEEVE POSITION

Control-lever position Degree: -3

rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 3.25

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1200 Aneroid pressure h: 700

Anerou Del.quantity : 76.0...77.0

: (74.0...79.0) : 3.00

cm3 Spread

1000 : (5.00)

RATED SPEED

1st version

Control lever

position degrees: 95...103

Testing:

1st rack travel in: 9.30 rpm : 1240...1250 Speed 2nd rack travel in: 4.50 rpm : 1260...1290 Speed 3rd rack travel in: 4.50 Speed rpm : 1275...1305 4th rack travel in: 1450 Speed rpm : 0.30...1.40 LOW IDLE 1 Control Lever position degrees: 67...75 Setting point w/out bumper spring rpm : 325 Rack travel in mm: 6.3 Testing: rpm : 100 Speed Minimum rack trave: 19.50 rpm : 325 Speed Rack travel in mm : 6.70...6.90 Rack travel in mm : 2.00 rpm : 485...545 Speed TORQUE CONTROL Torque control curve - 1st version rpm : 1200 1st speed Rack travel in m: 10.30...10.40 2nd speed rpm : 500 Rack travel in m: 11.40...11.50 4th speed rpm : 870 Rack travel in m: 10.80...11.00 Aneroid/Altitude Compensator Test 1st version Settina : 500 Speed rpm hPa : 700 Pressure Rack travel mm : 11.40...11.50 Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 10.20...10.30 2nd pressure hPa : 275 Rack travel in m: 11.00...11.10 3rd pressure hPa : 190 Rack travel in m: 10.40...10.60 FUEL DELIVERY CHARACTERISTICS

Del.quantity cm3/: 79.0...81.0
1000 s: (76.5...83.5)

Aneroid pressure h: Speed rpm : 500
Del.quantity cm3/: 60.0...61.0
1000 s: (58.0...63.0)

BREAKAWAY

1st version
1mm rack travel less than
full load rack tr: 9.30
Speed rpm : 1240...1250

STARTING FUEL DELIVERY

Remarks:

: RENAULT

WELFTON! TOU

Tractor (tractor engines)

Speed

1st version

Aneroid pressure h: 700

rpm

: 600

#### Note remarks

: MWM 6,2 e10 Test sheet Edition : 08.06.90

Replaces

: ISO-4113 Test oil

Combination no. : 0 400 866 165

Injection pump

Pump designation : PES6A90D320/3RS2660

EP type number : 0 410 896 078

Governor

Governor design. : RSV325...900A1C2250R

: 0 420 233 266 Governer no.

Customer-spec. information Customer : MWM

Engine : TD226B-6

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.95...3.05 Prestroke mm

: (2.90...3.10)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-Firing order

: 0-60-120-180-240-300 Phasina

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : -1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50 & maximum rack tra: 21.00

Difference ° CS : 3.50...4.50

BASIC SETTING

1st speed rpm: 900

Rack travel in mm : 12.00...12.10

Del.quantity cm3/: 9.4...9.5

100 s: (9.2...9.7)

cm3 : 0.3Spread

100 s: (0.5)

rpm : 325.0 2nd speed

Rack travel in mm: 7.0...7.2 Del.guantity cm3/: 1.0...1.6

100 s: (0.8...1.8) cm3 : 0.2

Spread 100 s: (0.4)

GUIDE SLEEVE POSITION

Control-lever position Degree: -3

rpm : 800 Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x : 4.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 900

Del.quantity

: 94.5...95.5 : (92.5...97.5) 1000

: 3.00 cm3 Spread 1000 : (5.00)

RATED SPEED

1st version Control lever

position degrees: 93...101

Testina:

1st rack travel in: 11.00

rpm : 940...950 Speed 2nd rack travel in: 4.00 rpm : 970...1000 Speed 3rd rack travel in: 4.00 rpm : 980...1010 Speed 4th rack travel in: 1145 Speed rpm : 0.30...1.40 LOW IDLE 1 Control lever position degrees: 69...77 Setting point w/out bumper spring Speed rpm : 325 Rack travel in mm : 5.5 Testing: rpm : 100 Speed Minimum rack trave: 19.50 Speed rpm : 325
Rack travel in mm : 5.90...6.10
Rack travel in mm : 2.00
Speed rpm : 370...430 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 900 Rack travel in m: 12.00...12.10 2nd speed rpm : 500 Rack travel in m: 12.00...12.20 **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 11.00 rpm : 940...950 Speed STARTING FUEL DELIVERY Speed rpm : 100 Del.quantity cm3/ : 133.0...143.0 1000 s: (130.0...146.0) Rack travel in mm : 19.50...21.00 Remarks:

Note remarks

Test sheet : STE 3,4 a : 10.08.90 Edition : 11.7.88 Replaces : ISO-4113 Test oil

Combination no. : 0 400 874 245

Injection pump

Pump designation : PES4A85D410RS2746 : 0 410 884 946 EP type number

Governor

: RSV300...1100A1C2227 Governor design.

: 0 420 232 491 Governer no.

Customer-spec. information : STEYR Customer

: WD411.87/88/91 Engine

1st version kW : 57.0 Rated speed : 2200

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening |

: 172...175 pressure, bar

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.85...2.95 Prestroke mm

: (2.80...3.00)

Rack travel in mm : 9.00...12.00 Firing order : 1-3-4-2

Phasina : 0-90-180-270

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 1100 1st speed

Rack travel in mm : 10.40...10.50

Del.guantity cm3/: 6.7...6.8

100 s: (6.5...7.0)

Spread cm3 : 0.3

100 s: (0.5)

2nd speed rpm : 300.0 Rack travel in mm : 6.1...6.3 Del.quantity cm3/ : 1.0...1.6 100 s: (0.8...1.7)

cm3 : 0.2Spread 100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 4.75

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1100 Speed

67.5...68.5 1000 : (65.5...70.5) cm3 : 3.00 Del.quantity

Spread

1000 : (5.00)

RATED SPEED

1st version

Control lever

position degrees: 106...114

Testing:

1st rack travel in: 9.40

rpm : 1140...1150 Speed

2nd rack travel in: 4.00

rpm : 1155...1185 Tractor (tractor engines) Speed 3rd rack travel in: 4.00 rpm : 1170...1200 Speed 4th rack travel in: 1335 Speed rpm : 0.30...1.40 LOW IDLE 1 Control lever position degrees: 71...79 Setting point w/out bumper spring Speed rpm : 300 Rack travel in mm : 5.7 Testing: Speed : 100 rpm Minimum rack trave: 19.50 Speed rpm : 300 Rack travel in mm : 6.10...6.30 Rack travel in mm : 2.00 : 365...425 Speed וחסבים. TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1100 Rack travel in m: 10.40...10.50 2nd speed rpm : 500 Rack travel in m: 11.30...11.40 4th speed rpm : 915 Rack travel in m: 10.80...11.00 FUEL DELIVERY CHARACTERISTICS 1st version Speed rpm : 750 Del.quantity cm3/ : 65.0...67.0 1000 s: (62.5...69.5) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 9.40 rpm : 1140...1150 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 95.0...105.0 1000 s: (92.0...108.0) Rack travel in mm : 19.50...21.00 Remarks:

APPLICATION

Note remarks

: KHD 6,1 e 7 Test sheet Edition : 08.06.90

Replaces

: TSO-4113 Test oil

Combination no. : 0 400 876 240

Injection pump

Pump designation : PES6A95D410RS2471 : 0 410 896 952 EP type number

Governor

Governor design. : RSV325...1400A8c674-

: 0 420 232 545 Governer no.

Customer-spec. information Customer : KHD

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina

: 172...175 pressure, bar

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 1.90...2.00 Prestroke mm

: (1.85...2.05) Rack travel in mm : 9.00...12.00

: 1-5- 3- 6- 2- 4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

rpm: 1400 1st speed

Rack travel in mm : 9.20...9.30

Del.quantity cm3/: 8.5...8.7

100 s: (8.3...8.9)

Spread cm3 : 0.3

100 s: (0.6)

2nd speed rpm : 325.0 Rack travel in mm: 6.4...6.6

GUIDE SLEEVE POSITION Control-lever position Degree: -3

Speed rpm: 800 Rack travel in mm: 0.30...1.00

Governor spring pre-tension

Click setting x : ?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1400 Speed Aneroid pressure h: 500

Del.quantity : 85.5...89.5)

: 3.50 Spread cm3 1000 : (6.00)

RATED SPEED

1st version Control lever

position degrees: 59...67

Testina:

1st rack travel in: 8.20

rpm : 1440...1450 Speed

2nd rack travel in: 4.00

Speed rpm : 1455...1485

3rd rack travel in: 4.00

rpm : 1475...1505 Speed 4th rack travel in: 1640

rpm : 0.30...1.70 Speed

LOW IDLE 1 Control lever

position degrees: 13...21

Setting point w/out bumper spring

Speed rpm : 325 Rack travel in mm: 6.0

Testing:

: 100 Speed rpm Minimum rack trave: 19.50 rpm : 325 Speed

Rack travel in mm: 6.40...6.60 Rack travel in mm: 2.00 Speed rpm : 555...615

TORQUE CONTROL

Torque control curve - 1st version

1st speed rpm : 1400 Rack travel in m: 9.20...9.30

rpm : 500 2nd speed

Rack travel in m: 10.50...10.60

4th speed rpm : 1045

Rack travel in m: 9.80...10.00

RACK STOP ADJUSTMENT

: 500 Speed rom

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 8.20

rpm : 1440...1450 Speed

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 116.5...126.5 1000 s: (113.5...129.5)

Remarks:

Check electrically unlatched starting fuel delivery (EES) with 24 volt.

On activation of the starting solenoid, the start position must be reached.

The stop position of the control rod must be easily reached with the stop lever

Note remarks

: KHD 6,1 e 8 Test sheet Edition : 08.06.90

Replaces

Test oil : ISO-4113

Combination no. : 0 400 876 275

Injection pump

Pump designation : PES6A95D41ORS2471 EP type number : 0 410 896 952

Governor

Governor design. : RSV325...1150A8C674-

3L

: 0 420 232 543 Governer no.

Customer—spec. information Customer : KHD

: BF6L9130 Engine

: 132.0 1st version kW : 2300 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening.

: 172...175 pressure, bar

Test lines : 1 680 750 014

Outside diameter x Wall thickness

x Lenath mm : 6.00X2.00X600

(A) Injection pump setting values

Insp. values in parentheses Set equal delivery quant.

per values \_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 1.90...2.00 Prestroke mm

: (1.85...2.05)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

rpm: 1150 1st speed

Rack travel in mm : 11.80...11.90

Del.quantity cm3/: 10.8...11.0

100 s: (10.6...11.2)

cm3 : 0.3Spread

100 s: (0.6)

2nd speed rpm : 325.0 Rack travel in mm : 7.2...7.4

Del.quantity cm3/: 1.6...2.2

100 s: (1.3...2.4) cm3 : 0.3 Spread

100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 rpm : 800

Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 4.75

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1150 Aneroid pressure h: 700

: 108.0...110.0 Del.quantity 1000 : (106.0...112.0) cm3 : 3.00

Spread

1000 : (6.00)

RATED SPEED

1st version

Control lever

position degrees: 102...110

Testing:

1st rack travel in: 10.80

rpm : 1190...1200 Speed

2nd rack travel in: 4.00

rpm : 1235...1265 Speed

3rd rack travel in: 4.00

rpm : 1285...1315 Speed

4th rack travel in: 1400

Speed rpm : 0.30...1.40

LOW IDLE 1 Control lever

position degrees: 67...75

Setting point w/out bumper spring

rpm : 325 Rack travel in mm: 6.8

Testing:

: 100 Speed rpm Minimum rack trave: 19.50

Speed rpm : 325
Rack travel in mm : 7.20...7.40
Rack travel in mm : 2.00 : 585...645 Speed rom

TORQUE CONTROL

Torque control curve - 1st version

1st speed rpm : 1150 Rack travel in m: 11.80...11.90

2nd speed rpm : 500

Rack travel in m: 11.80...12.00

Aneroid/Altitude Compensator Test

1st version Setting

: 500 Speed rpm hPa : 700 Pressure

: 11.80...11.90 Rack travel mm

Measurement

1/min : 500Speed

1st pressure hPa : -

Rack travel in m: 9.80...10.00

2nd pressure hPa : 220

Rack travel in m: 11.20...11.30 3rd pressure hPa : 140

Rack travel in m: 10.90...11.10

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 700 : 850 Speed

rpm Del.quantity cm3/: 103.5...106.5 1000 s: (101.0...109.0)

1000 s: (7.)

Aneroid pressure h: -

: 500 Speed rpm

Del.quantity cm3/: 62.0...64.0 1000 s: (60.0...66.0)

RACK STOP ADJUSTMENT

: 500 Speed rpm

BREAKAWAY

1st version

1mm rack travel less than

full load rack tr: 10.80

rpm : 1190...1200 Speed

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 120.0...130.0

1000 s: (117.0...133.0) Rack travel in mm : 15.50...15.90

Remarks:

Check electrically unlatched starting fuel delivery (EES) with 24 volt.

On activation of the starting solenoid, the start position must be reached.

The stop position of the control rod must be easily reached with the stop lever

**APPLICATION** 

Installation 2300

Note remarks

: KHD 1 o 5 Test sheet Edition : 08.06.90

Replaces

: ISO-4113 Test oil

Combination no. : 0 400 876 305

Injection pump

Pump designation : PES6A95D410RS2625 EP type number : 0 410 896 926

Governor

Governor design. : RSV325...1150A8C674-

: 0 420 232 542 Governer no.

Customer-spec. information Customer : KHD

: BF6L913B Engine

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

**Opening** 

: 172...175 pressure, bar

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

: 6,00X2,00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 1.90...2.00

: (1.85...2.05)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

BASIC SETTING

rpm: 1150 1st speed

Rack travel in mm : 11.40...11.50

Del.quantity cm3/: 8.0...8.2

100 s: (7.8...8.4)

cm3 : 0.3Spread

100 s: (0.6)

2nd speed rpm : 325.0 Rack travel in mm : 7.2...7.4 Del.quantity cm3/: 1.6...2.2

100 s: (1.3...2.4) Spread cm3 : 0.3

100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position Degree: -3

rpm : 800

Rack travel in mm: 0.30...1.00

Governor spring pre-tension

Click setting x :?

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1150 Aneroid pressure h: 700

: 80.0...82.0 Del.quantity

1000 : (78.0...84.0)

: 3.50 cm3 Spread

1000 : (6.00)

RATED SPEED

1st version Control Lever

position degrees: 96...104

Testing:

15% rack travel in: 10.40

Speed

rpm : 1190...1200

2nd rack travel in: 4.00

rpm : 1205...1235 Speed

3rd rack travel in: 4.00 Speed rpm : 1265...1295

4th rack travel in: 1430

rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 61...69 Setting point w/out bumper spring : 325 Speed rpm Rack travel in mm: 6.8 Speed rpm : 325
Rack travel in mm : 7.20...7.40
Rack travel in mm : 2.00 rpm : 585...645 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1150 Rack travel in m: 11.40...11.50 2nd speed rpm : 500 Rack travel in m: 12.10...12.20 3rd speed rpm : 1000 Rack travel in m: 11.80...12.00 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm hPa : 700 Pressure : 12.20...12.30 Rack travel mm Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 11.10...11.20 2nd pressure hPa : 355 Rack travel in m: 11.90...12.00 3rd pressure hPa : 200 Rack travel in m: 11.10...11.30 FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 700 rpm : 800 Speed Del.quantity cm3/: 83.0...86.0 1000 s: (80.5...88.5) Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 56.5...59.5 1000 s: (54.5...61.5) RACK STOP ADJUSTMENT rpm : 500 Speed

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 10.40

rpm : 1190...1200 Speed

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 116.5...126.5 1000 s: (113.5...129.5)

Rack travel in mm: 15.90...16.40

Remarks:

**APPLICATION** 

Excavator

K01

Note remarks

Test sheet : DAF 6,2 o 3
Edition : 29.05.90
Replaces : 12.4.90

Test oil : ISO-4113

Combination no. : 0 400 876 327

Injection pump

Pump designation : PES6A95D32ORS2693

EP type number : 0 410 896 914

Governor

Governor design. : RSV300...1300A0C2195

R

Governer no. : 0 420 233 200

Customer—spec. information Customer : DAF

Engine : DNT 620

TEST BENCH REQUIREMENTS

Test oil

inlet t% ... °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Opening

pressure, bar : 172...175

Test lines : 1 680 750 015

Outside diameter x Wall thickness

x Length mm : 6.00x1.50x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 2.00...2.10

: (1.95...2.15)
Rack travel in mm : 7.50...10.50

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance  $+ - \circ : 0.50 (0.75)$ 

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50

& maximum rack tra: 21.00 Difference ° CS : 2.50...3.50

BASIC SETTING

1st speed rpm: 850

Rack travel in mm : 11.60...11.70

Del.quantity cm3/: 7.7...7.8

100 s: (7.5...8.0)

Spread cm3 : 0.3

100 s: (0.6)

2nd speed rpm : 300.0 Rack travel in mm : 6.5...6.7 Del.quantity cm3/ : 0.7...1.1

100 s: (0.4...1.3)

Spread cm3 : 0.3 100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 Speed rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 6.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm: 850 Aneroid pressure h: 700

Aneroid pressure 1. 75. Pel.quantity : 77.5...78.5 (75.5...80.5)

Spread cm3 : 3.50

1000 : (6.00)

RATED SPEED

1st version Control lever

position degrees: 108...116

rpm : 600 1st rack travel in: 9.70 Speed Del.quantity cm3/: 65.5...66.5 1000 s: (63.5...68.5) rpm : 1340...1350 Speed 2nd rack travel in: 4.00 rpm : 1400...1430 Speed 3rd rack travel in: 4.00 rpm : 1425...1455 **BREAKAWAY** Speed 4th rack travel in: 1580 rpm : 0.30...1.40 1st version Speed 1mm rack travel less than LOW IDLE 1 Control lever full load rack tr: 9.70 rpm : 1340...1350 position degrees: 75...83 Speed Setting point w/out bumper spring rpm : 300 STARTING FUEL DELIVERY Rack travel in mm: 6.1 rpm : 100 Testing: Speed Del.quantity cm3/: 130.0...145.0 1000 s: (127.0...148.0) rpm : 100 Speed Minimum rack trave: 19.50 : 300 Rack travel in mm : 19.50...21.00 rpm Rack travel in mm : 6.50...6.70 Rack travel in mm: 2.00 LOW IDLE rpm : 600...660 Speed rpm : 300 Speed Rack travel in mm : 6.50...6.70 TORQUE CONTROL Torque control curve - 1st version Del.quantity cm3/ : 7.0...11.0 1000 s: (4.5...13.5) 1st speed rpm : 1290 Rack travel in m: 10.70...10.80 2nd speed rpm : 500 Rack travel in m: 11.60...11.70 cm3 : 3.50 Spread 1000 s: (5.50) 4th speed rpm : 1060 Remarks: Rack travel in m: 11.00...11.20 Aneroid/Altitude Compensator Test 1st version Setting : 600 Speed rpm hPa : 700 Pressure : 11.60...11.70 Rack travel mm Measurement  $1/\min : 600$ Speed 1st pressure hPa : -Rack travel in m: 11.10...11.30 2nd pressure hPa : 250 Rack travel in m: 11.50...11.60 FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 700 : 1290 Speed rpm Del.quantity cm3/: 74.0...76.0 1000 s: (71.5...78.5)

Aneroid pressure h: -

Testina:

Note remarks

Test sheet : DAF 6,2 0 2 : 29.05.90 Edition

: 12.1.90 Replaces : ISO-4113 Test oil

Combination no. : 0 400 876 332

Injection pump

Pump designation : PES6A95D32ORS2693 : 0 410 896 914

EP type number

Governor

Governor design. : RSV300...1300A0C2206

: 0 420 233 204 Governer no.

Customer-spec. information

Customer : DAF

: DNTD 620 Engine

: 110.0 : 2600 1st version kW Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

Test Lines : 1 680 750 015

Outside diameter

x Wall thickness

x Length mm : 6.00x1.50x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.00...2.10 Prestroke mm

: (1.95...2.15)

Rack travel in mm : 7.50...10.50

Firing order : 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50 & maximum rack tra: 21.00 Difference ° CS : 2.50...3.50

BASIC SETTING

1st speed rpm: 850

Rack travel in mm : 10.80...10.90

Del.quantity cm3/: 6.5...6.6

100 s: (6.3...6.8)

Spread cm3 : 0.3

100 s: (0.6)

rpm : 300.0 2nd speed

Rack travel in mm: 6.3...6.5 Del.quantity cm3/ : 0.7...1.1

100 s: (0.4...1.3)

cm3 : 0.3Spread

100 s: (0.5)

GUIDE SLEEVE POSITION

Control-lever position Degree: -3

rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension

Click setting x : 5.50

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 850 Speed

: 65.5...66.5 Del.quantity 1000 : (63.5...68.5)

: 3.50 Spread cm3

1000 : (6.00)

RATED SPEED

1st version

Rack travel in mm : 19.50...21.00 Control Lever position degrees: 108...116 LOW IDLE Testing: rpm : 300 1st rack travel in: 9.20 Speed Speed rpm : 1340...1350 Rack travel in mm : 6.30...6.50 Del.quantity cm3/: 7.0...11.0 1000 s: (4.5...13.5) Spread cm3 : 3.50 2nd rack travel in: 4.00 rpm : 1400...1430 Speed 3rd rack travel in: 4.00 1000 s: (5.50) rpm : 1425...1455 Speed 4th rack travel in: 1570 Speed rpm : 0.30...1.40 Remarks: LOW IDLE 1 Control lever position degrees: 76...84 Setting point w/out bumper spring rpm : 300° Rack travel in mm: 5.9 Testing: Speed rpm : 100 Minimum rack trave: 19.50 rpm : 300 Speed Rack travel in mm : 6.30...6.50 Rack travel in mm: 2.00 rpm : 590...650 Speed TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1290 Rack travel in m: 10.20...10.40 2nd speed rpm : 500 Rack travel in m: 10.80...10.90 4th speed rpm : 1005 Rack travel in m: 10.50...10.70 FUEL DELIVERY CHARACTERISTICS 1st version rpm : 1290 Speed Del.quantity cm3/: 69.0...71.0 1000 s: (66.5...73.5) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 9.20 rpm : 1340...1350 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 130.0...145.0 1000 s: (127.0...148.0)

BOSCH INJ. PUMP TEST SPECIFICATIONS Phasing Note remarks : FIA 5,9 c : 21.05.90 Test sheet Edition : 30.3.90 Replaces Test oil : ISO-4113 : 0 400 876 349 Combination no. 1st speed Injection pump Pump designation : PES6A90D410RS2757 EP type number : 0 410 896 086 Governor : RSV425...1000A1c2233 Governor design. : 0 420 232 496 Governer no. Spread Customer-spec. information : IVECO-FIAT Customer : 8065,25,080 Engine TEST BENCH REQUIREMENTS Test oil Spread inlet temp. °C : 38...42 Overflow valve : 1 417 413 000 Inlet press., bar: 1.50 Speed Test nozzle holder : 0 681 343 009 assembly Opening pressure, bar : 172...175 1st version Test lines : 1 680 750 014 Speed Outside diameter x Wall thickness x Length mm : 6.00X2.00X600 Spread (A) Injection pump setting values RATED SPEED Insp. values in parentheses Set equal delivery quant. 1st version per values BEGINNING OF DELIVERY Test pressure, bar: 25...27

: 2.25...2.35

Rack travel in mm : 9.00...12.00

: (2.20...2.40)

: 1-5-3-6-

: 0-60-120-180-240-300 Tolerance + - ° : 0.50 (0.75) Time to cyl. no. : 1 BASIC SETTING rpm: 1000 Rack travel in mm : 11.80...11.90 Del.quantity cm3/: 9.0...9.1 100 s: (8.8...9.3) cm3 : 0.3100 s: (0.5) 2nd speed rpm : 475.0
Rack travel in mm : 7.1...7.3
Del.quantity cm3/ : 1.0...1.6 100 s: (0.8...1.8) cm3 : 0.2100 s: (0.4) GUIDE SLEEVE POSITION Control-lever position Degree: -3 rpm : 800 Rack travel in mm : 0.30...0.70 Governor spring pre-tension Click setting x : 4.75FULL LOAD DELIV. AT FULL LOAD STOP rpm : 1000 Aneroid pressure h: 800 Del.quantity : yu.u....93.0) : 3.00 cm3 1000 : (5.00) Control lever position degrees: 101...109 Testing: 1st rack travel in: 10.80 rpm : 1040...1050 Speed 2nd rack travel in: 4.00 Speed rpm : 1090...1120 3rd rack travel in: 4.00

Prestroke mm

Firing order

rpm : 1140...1170 Speed 4th rack travel in: 1240 rpm ; 0.30...1.40 Speed

LOW IDLE 1 Control lever

position degrees: 77...85

Setting point w/out bumper spring

Speed rpm : 475 Rack travel in mm: 6.7

Testina:

Speed : 100 rpm Minimum rack trave: 19.50 : 175 rpm

Rack travel in mm : c 60...6.80

Rack travel in mm : 2.00 rpm : 610...670 Speed

TORQUE CONTROL

Torque control curve - 1st version

1st speed rpm : 1000

Rack travel in m: 11.80...11.90

2nd speed rpm : 500 Rack travel in m: 11.80...12.00

Aneroid/Altitude Compensator Test

1st version

Setting

: 500 Speed rpm Pressure hPa : -

Rack travel mm : 11.30...11.50

2nd pressure hPa : 780

Rack travel in m: 11.70...11.80

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 10.80

rpm : 1040...1050 Speed

STARTING FUEL DELIVERY

: 100 rpm

Del.quantity cm3/: 85.0...95.0 1000 s: (82.0...98.0)

Rack travel in mm : 19.50...21.00

Remarks:

Check electrically unlatched starting fuel delivery (EES) with 24 volt.

On activation of the starting solenoid, the start position must be reached.

K07

Note remarks

: DAF 6,2 o 5 Test sheet : 29.05.90 Edition : 12.1.90 Replaces : ISO-4113 Test oil

: D 400 876 356 Combination no.

Injection pump

Pump designation : PES6A95D32ORS2693 : 0 410 896 914 EP type number

Governor

: RSV300...1300A0c2195 Governor design.

-1R

: 0 420 233 222 Governer no.

Customer-spec. information : DAF Customer

: DNT 620 Engine

TEST BENCH REQUIREMENTS

Test oil

: 38...42 inlet temp. °C

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening.

: 172...175 pressure, bar

Test Lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values

BEGINNING OF DELIVERY Test pressure, bar: 25...27

: 2.00...2.10 Prestroke mm

: (1.95...2.15) Rack travel in mm : 7.50...10.50

: 1-5- 3- 6-Firing order

Phasina : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50

& maximum rack tra: 21.00 Difference ° CS : 2.50...3.50

BASIC SETTING

rom : 8501st speed

Rack travel in mm : 11.60...11.70

Del.quantity cm3/: 7.7...7.8

100 s: (7.5...8.0)

cm3 : 0.3Spread

100 s: (0.6)

rpm : 300.02nd speed Rack travel in mm: 6.5...6.7 Del.quantity cm3/: 0.7...1.1 100 s: (0.4...1.3)

cm3 : 0.3Spread 100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position Degree: -3

rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 6.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 850 Aneroid pressure h: 700

Anerotu p. Del.quantity 1000 : 77.5...78.5 : (75.5...80.5) : 3.50

Spread cm3 1000 : (6.00)

RATED SPEED

1st version Control lever

position degrees: 106...114

Aneroid pressure h: -Testina: Speed rpm: 600 Del.quantity cm3/: 65.5...66.5 1000 s: (63.5...68.5) 1st rack travel in: 9.70 rpm : 1340...1350 Speed 2nd rack travel in: 4.00 rpm : 1400...1430 Speed 3rd rack travel in: 4.00 rpm : 1425...1455 BREAKAWAY Speed 4th rack travel in: 1580 rpm : 0.30...1.40 1st version Speed 1mm rack travel less than LOW IDLE 1 full load rack tr: 9.70 Control Lever position degrees: 75...83 rpm : 1340...1350 Speed Setting point w/out bumper spring rpm : 300 STARTING FUEL DELIVERY Speed Rack travel in mm: 6.1 rom : 100 Testina: Speed Del.quantity cm3/: 130.0...145.0 1000 s: (127.0...148.0) Speed rpm : 100 Minimum rack trave: 19.50 rpm : 300 Rack travel in mm : 19.50...21.00 Speed Rack travel in mm : 6.50...6.70 Rack travel in mm : 2.00 LOW IDLE rpm : 600...660 Speed rpm : 300 Speed Rack travel in mm : 6.50...6.70 TORQUE CONTROL Del.quantity cm3/: 7.0...11.0 1000 s: (4.5...13.5) Spread cm3 : 3.50 1000 s: (5.50) Torque control curve - 1st version Rack travel in m: 10.70...10.80 ad speed rpm : 500 1st speed 2nd speed Rack travel in m: 11.60...11.70 4th speed rpm : 1060 Remarks: Rack travel in m: 11.00...11.20 Aperoid/Altitude Compensator Test 1st version Setting : 600 Speed man hPa : 700 Pressure Rack travel mm : 11.60...11.70 Measurement 1/min: 600 Speed 1st pressure hPa : -Rack travel in m: 11.10...11.30 2nd pressure hPa : 250 Rack travel in m: 11.50...11.60 FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 700 rpm : 1290 Del.quantity cm3/: 74.0...76.0 1000 s: (71.5...78.5)

Note remarks

Test sheet : KHD 1 g 39 Edition : 08.06.90

Replaces : 3.11.89 Test oil : ISO-4113

Combination no. : 0 400 876 365

Injection pump

Pump designation : PES6A85D41ORS2761-1

EP type number : 0 410 886 894

Governor

Governor design. : RSV325...1150A8C2020

-1L

Governer no. : 0 420 232 515

Customer-spec. information

Customer : KHD

Engine : BF6L913

1st version kW : 110.0 Rated speed : 2300

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Opening.

pressure, bar : 172...175

Test Lines : 1 680 750 014

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses

Set equal delivery quant. per values

,

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 2.50...2.60

: (2.45...2.65)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

BASIC SETTING

1st speed rpm: 1150

Rack travel in mm : 12.00...12.10

Del.quantity cm3/: 8.3...8.4

100 s: (8.1...8.6)

Spread cm3 : 0.3

100 s: (0.5)

2nd speed rpm : 325.0 Rack travel in mm : 7.3...7.5

Del.quantity cm3/: 0.8...1.4

100 s: (0.6...1.6)

Spread cm3 : 0.2 100 s: (0.4)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 4.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1150 Aneroid pressure h: 700

Del.quantity : 83.5...84.5

1000 : (81.5...86.5) cm3 : 3.00

Spread cm3 : 3.00 1000 : (5.00)

RATED SPEED

1st version

Control lever

position degrees: 98...106

Testing:

1st rack travel in: 11.00

Speed rpm : 1190...1200

2nd rack travel in: 4.00

Speed rpm : 1220...1250

3rd rack travel in: 4.00 rpm : 1240...1270 Speed 4th rack travel in: 1405 rom : 0.30...1.40Speed

LOW IDLE 1 Control Lever

position degrees: 63...71 Setting point w/out bumper spring

rpm : 325 Rack travel in mm: 6.9

Testina:

: 100 Speed rpm Minimum rack trave: 19.50 Speed rpm : 325 Rack travel in mm : 7.30...7.50

Rack travel in mm: 2.00 : 420...480 Speed rom

TORQUE CONTROL

Torque control curve - 1st version

rpm : 1150 1st speed

Rack travel in m: 12.00...12.10

rpm : 750 2nd speed

Rack travel in m: 12.90...13.00 d speed rpm : 890

3rd speed rpm

Rack travel in m: 12.30...12.50

Aneroid/Altitude Compensator Test

1st version Settina

: 500 Speed rpm hPa : -Pressure

: 11.50...11.60 Rack travel mm

Measurement

1/min: 500 Speed

1st pressure hPa : 300

Rack travel in m: 11.80...12.00 3rd pressure hPa : 700

Rack travel in m: 12.90...13.00

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 700 : 750 rpm

Del.quantity cm3/: 89.0...91.0 1000 s: (86.5...93.5)

Aneroid pressure h: -

rpm\_ : 500 Speed

Del.quantity cm3/: 64.5...65.5

1000 s: (62.5...67.5)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 11.00

Speed rpm : 1190...1200

STARTING FUEL DELIVERY

rpm : 100 Speed

Del.quantity cm3/: 110.0...120.0 1000 s: (107.0...123.0) Rack travel in mm: 17.00...17.40

Remark:

: DX6.60

APPLICATION

Tractor (tractor engines)

Note remarks

: DEE 7,6 h15 Test sheet : 17.05.90 Edition : 2.5.90 Replaces Test oil : ISO-4113

Combination no. : 0 400 876 371

Injection pump

Pump designation : PES6A100D410RS2676-1

EP type number : 9 410 230 024

Governor

Governor design. : RSV450...1050A0C2204

-6L

: 0 420 232 539 Governer no.

Customer-spec. information : JOHN DEERE Customer

: 6466AT13 Engine

1st version kW : 120.0 Rated speed : 2100

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 457 413 010

Inlet press., bar: 1.50

Test nozzle holder

assembly : 1 688 901 101

Opening

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

Prestroke mm : 2.45...2.55 : (2.40...2.60)

Rack travel in mm: 10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1050

Rack travel in mm : 10.10...10.20

Del.quantity cm3/: 10.1...10.3

100 s: (9.9...10.5)

cm3 : 0.4Spread

100 s: (0.6)

rpm : 450.0 2nd speed Rack travel in mm: 5.4...5.6 Del.quantity cm3/: 1.7...2.1

100 s: (1.5...2.3)

cm3 : 0.6Spread 100 s: (0.8)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

Speed rpm: 800 Rack travel in mm: 0.30...0.70

Governor spring pre-tension Click setting x : 5.50

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1050 Speed

: 101.5...103.5 Del.quantity 1000 : (99.5...105.5)

cm3 : 4.00

Spread 1000 : (6.50)

RATED SPEED

1st version

Control lever position degrees: 35...43

Testing:

1st rack travel in: 9.10 rpm : 1095...1105 Speed 2nd rack travel in: 4.00 rpm : 1180...1190 Speed

3rd rack travel in: 4.00

rpm : 1185...1215 Speed 4th rack travel in: 1350

rpm : 0.30...1.40 Speed

LOW IDLE 1 Control Lever

position degrees: 19...27

Setting point w/out bumper spring

rpm : 450 Rack travel in mm: 5.0

Testina:

Speed rpm : 100 Minimum rack trave: 19.00 rpm : 450

Rack travel in mm : 5.40...5.60

TORQUE CONTROL

Torque control curve - 1st version

1st speed rpm : 1050

Rack travel in m: 10.10...10.20

2nd speed rpm : 650

Rack travel in m: 10.80...11.00

FUEL DELIVERY CHARACTERISTICS

1st version

: 650 Speed rpm

Del.quantity cm3/: 112.0...116.0 1000 s: (110.0...118.0)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 9.10

rpm : 1095...1105 Speed

STARTING FUEL DELIVERY

: 100 Speed rpm

Del.quantity cm3/: 190.0...210.0 1000 s: (185.0...215.0)

LOW IDLE

Speed rpm : 450
Rack travel in mm : 5.40...5.60
Del.quantity cm3/ : 17.5...21.5

1000 s: (15.5...23.5)

cm3 : 6.00Spread 1000 s: (8.00)

Remarks:

: JOHN DEERE # RE44344 Start-of-delivery mark at control-rod travel 10.5 mm and 15° after start of delivery.

Starting/full-load transition speed from holding magnet = 450 1/min.

APPLICATION

Excavator

Note remarks

: DEE 7,7 e 1 Test sheet Edition : 08.08.90

Replaces

: ISO-4113 Test oil

Combination no. : 0 400 876 372

Injection pump

Pump designation : PES6A100D410RS2764-1

EP type number : 0 410 806 007

Governor

: RSV600...1100A2C2161 Governor design.

: 0 420 232 540 Governer no.

Customer-spec. information

: JOHN DEERE Customer

: 6466A7003 Engine

: 164.0 1st version kW Rated speed : 2200

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 457 413 010

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 190...200

Test nozzle holder

: 1 688 901 101 assembly

Opening |

: 207...210 pressure, bar

Orifice plate

diameter mm : 0.6

Test Lines : 1 680 750 008

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

: 2.45...2.55 Prestroke mm

: (2.40...2.60)

Rack travel in mm: 10.50

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

rpm: 1100 1st speed

Rack travel in mm : 13.00...13.10

Del.quantity cm3/: 12.4...12.6

100 s: (12.2...12.8)

Spread cm3 : 0.4

100 s: (0.6)

2nd speed rpm : 600.0

Rack travel in mm: 6.0...6.2 Del.quantity cm3/: 1.7...2.1 100 s: (1.5...2.3)

Spread cm3 : 0.6100 s: (0.8)

GUIDE SLEEVE POSITION Control-lever position

> Degree: -3 rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 2.50

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1100 Speed Aneroid pressure h: 900

Del.quantity

: 124.5...126.5 : (122.5...128.5) 1000

cm3 : 4.00 Spread

1000 : (6.50)

RATED SPEED

1st version

Control lever position degrees: 37...45 Testing: 1st rack travel in: 12.00 Speed rpm : 1145...1155 2nd rack travel in: 4.00 rpm : 1195...1205 Speed 3rd rack travel in: 4.00 rpm : 1215...1245 Speed 4th rack travel in: 1350 rpm : 0.30...1.40 Speed LOW IDLE 1 Control lever position degrees: 19...27 Setting point w/out bumper spring rpm : 600 Speed Rack travel in mm: 5.6 Testing: Speed rpm Minimum rack trave: 19.00 rpm : 600 Speed Rack travel in mm : 6.00...6.20 Aneroid/Altitude Compensator Test 1st version Setting Speed : 500 rpm Pressure hPa : -Rack travel mm : 9.30...9.50 Measurement 1/min: 500 Speed 1st pressure hPa : 175 Rack travel in m: 10.30...10.40 2nd pressure hPa : 280 Rack travel in m: 12.10...12.50 3rd pressure hPa : 900 Rack travel in m: 13.00...13.10 FUEL DELIVERY CHARACTERISTICS

1st version Aneroid pressure h: -Speed rpm: 500 Del.quantity cm3/: 68.0...72.0 1000 s: (66.0...74.0) BREAKAWAY 1st version K15

1mm rack travel less than full load rack tr: 12.00 rpm : 1145...1155 Speed STARTING FUEL DELIVERY Speed rom Del.quantity cm3/: 180.0...200.0 1000 s: (175.0...205.0) LOW IDLE rpm : 600 Speed Rack travel in mm : 6.00...6.20 Del.quantity cm3/: 17.0...21.0 1000 s: (15.0...23.0) cm3 : 6.00Spread 1000 s: (8.00) Remarks: : JOHN DEERE # RE44661 Start-of-delivery mark at control-rod travel 10.5 mm and 15° after start of delivery.

Starting/full-load transition speed from holding magnet = 450 1/min.

Note remarks

: DEE 7,7 e 2 : 09.07.90 Test sheet Edition

Replaces

Test oil : ISO-4113

: 0 400 876 373 Combination no.

Injection pump

Pump designation : PES6A100D410RS2764-1

: 0 410 806 007 EP type number

Governor

: RSV600...1100A2C2161 Governor design.

-8L

: 0 420 232 541 Governer no.

Customer-spec. information

: JOHN DEERE Customer

: 6466AZOO4 Engine

: 150.0 : 2200 1st version kW Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 457 413 010

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 190...200

Test nozzle holder

assembly : 1 688 901 101

Opening

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 27...29

: 2.45...2.55 : (2.40...2.60) Prestroke mm

Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 1100 1st speed

Rack travel in mm : 12.30...12.40

Del.quantity cm3/: 11.6...11.8

100 s: (11.4...12.0)

cm3 : 0.4Spread

100 s: (0.6)

rpm : 600.0 2nd speed Rack travel in mm : 6.3...6.5

Del.quantity cm3/: 1.9...2.3 100 s: (1.7...2.5)

Spread cm3 : 0.6

100 s: (0.8)

GUIDE SLEEVE POSITION

Control-lever position Degree: -3

rpm : 800

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 4.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1100 Speed Aneroid pressure h: 900

: 116.0...118.0 Del.quantity

1000 : (114.0...120.0)

cm3 : 4.00 Spread

1000 : (6.50)

RATED SPEED

1st version

Control lever

position degrees: 41...49

Testing:

1st rack travel in: 11.30

rpm : 1155...1165 Speed

2nd rack travel in: 4.00

rpm : 1220...1230 Speed

3rd rack travel in: 4.00

rpm : 1220...1250 Speed

4th rack travel in: 1300

Speed rpm : 0.30...1.40

LOW IDLE 1

Control Lever

position degrees: 22...30

Setting point w/out bumper spring

rpm : 600 Rack travel in mm: 5.9

Testing:

Speed : 100 rom

Minimum rack trave: 19.00 Speed rpm : 600

Rack travel in mm : 6.30...6.50

TORQUE CONTROL

Torque control curve - 1st version

1st speed rpm : 1100

Rack travel in m: 12.30...12.40 2nd speed rpm : 750

Rack travel in m: 13.90...14.10

Aneroid/Altitude

Compensator Test

1st version Setting

Speed rpm

: 500

Pressure hPa: -

Rack travel mm : 9.60...9.80

Measurement

1/min: 500 Speed

1st pressure hPa : 95

Rack travel in m: 10.60...10.70

2nd pressure hPa : 200

Rack travel in m: 12.60...13.00

3rd pressure hPa : 900

Rack travel in m: 13.90...14.10

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 900 rpm : 750 Speed

Del.quantity cm3/: 138.5...142.5 1000 s: (136.5...144.5)

Aneroid pressure h: -

Speed rpm: 500 Del.quantity cm3/: 70.5...74.5

1000 s: (68.5...76.5)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 11.30

rpm : 1155...1165 Speed

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/: 180.0...200.0

1000 s: (175.0...205.0)

LOW IDLE

Speed rpm : 600 Rack travel in mm : 6.30...6.50 Del.quantity cm3/: 19.0...23.0

1000 s: (17.0...25.0)

Spread cm3 : 6.001000 s: (8.00)

Remarks:

: JOHN DEERE # RE44662

Start-of-delivery mark = 15.5° after

start of delivery cyl. 1.

Starting/full-load transition speed from holding magnet = 450 1/min.

Adjustment without torque-control spring retainer with 0,5 mm less control-rod travel. Increase in full-load delivery with torque-control spring retainer.

Note remarks

Test sheet : HAN 10,8 f6 : 17.05.90 Edition : 1.9.89 Replaces : ISO-4113 Test oil

Combination no. : 0 401 076 009

Injection pump

Pump designation : PE6A100D32ORS3030-1

EP type number : 0 411 006 019

Governor

Governor design. : RSV350...1100A8C2232

: 0 420 233 218 Governer no.

Customer-spec. information : HANOMAG Customer

: D946T-70E Engine

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 000

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening.

: 172...175 pressure, bar

Test Lines : 1 680 750 003

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 1.80...1.90 Prestroke mm

: (1.75...1.95)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-Firing order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 8.50...9.50

& maximum rack tra: 21.00 Difference ° CS : 5.50...6.50

BASIC SETTING

rpm: 1100 1st speed

Rack travel in mm : 9.80...9.90

Del.quantity cm3/: 12.6...12.8

100 s: (12.4...13.0)

Spread cm3 : 0.3

100 s: (0.6)

rpm : 350.02nd speed Rack travel in mm : 5.9...6.1 Del.quantity cm3/ : 1.1...1.7 100 s: (0.8...1.9)

cm3 : 0.3Spread 100 s: (0.5)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3 rpm : 800 Speed

Rack travel in mm : 0.30...0.70

Governor spring pre-tension Click setting x : 3.75

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1100 Aneroid pressure h: 700

Anerolu F. Del.quantity 1000 : 126.0...128.0 : (124.0...130.0)

: 3.50 Spread cm3

1000 : (6.00)

RATED SPEED

1st version

Control lever

position degrees: 95...103

Testina: 1st rack travel in: 8.80 rpm : 1140...1150 Speed 2nd rack travel in: 4.00 rpm : 1155...1185 Speed 3rd rack travel in: 4.00 rpm : 1175...1205 Speed 4th rack travel in: 1340 Speed rpm : 0.30...1.40LOW IDLE 1 Control lever position degrees: 65...73 Setting point w/out bumper spring Speed rpm : 350 Rack travel in mm : 5.5 Testing: Speed : 100 rpm Minimum rack trave: 19.50 rpm Speed : 350 Rack travel in mm : 5.90...6.10 Rack travel in mm: 2.00 Speed rpm : 475...535 TORQUE CONTROL Torque control curve - 1st version rpm : 1100 1st speed Rack travel in m: 9.80...9.90 2nd speed rpm : 500 Rack travel in m: 10.60...10.70 3rd speed rpm : 915 Rack travel in m: 10.10...10.30 Aneroid/Altitude Compensator Test 1st version Settina rpm : 500 hPa : 700 Speed rom Pressure Rack travel mm : 10.60...10.70 Measurement  $1/\min : 500$ Speed 1st pressure hPa : -Rack travel in m: 8.90...9.00 2nd pressure hPa : 450 Rack travel in m: 10.10...10.20 3rd pressure hPa : 290 Rack travel in m: 9.30...9.50 FUEL DELIVERY CHARACTERISTICS

Del.quantity cm3/: 89.0...91.0 1000 s: (87.0...93.0)

1st version 1mm rack travel less than

full load rack tr: 8.80 Speed rpm : 1140...1150

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 220.0...235.0 1000 s: (217.0...238.0) Rack travel in mm : 19.50...21.00

Remarks:

K19

Speed

1st version

Aneroid pressure h: -

rpm : 500

Note remarks

Test sheet : STE 12,0 g : 29.05.90 Edition

Replaces

: ISO-4113 Test oil

Combination no. : 0 401 838 705

Injection pump

Pump designation : PE8P110A120LS3252

: 0 411 818 721 EP type number

Governor

Governor design. : RQV250...1100PA951

: 0 421 813 854 Governer no.

Customer-spec. information Customer : STEYR

: WD815.66 Engine

1st version kW : 270.0 : 2200 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Openina |

: 172...175 pressure, bar

Test lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.80...2.90 Prestroke mm : (2.75...2.95)

Rack travel in mm : 9.00...12.00

: 1- 5- 4- 8- 6- 3-7- 2 Firing order

: 0-45-90-135-180-225-Phasing

270-315

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

rpm: 1100 1st speed

Rack travel in mm : 13.10...13.20

Del.quantity cm3/: 17.4...17.6

100 s: (17.1...17.9)

Spread cm3 : 0.4

100 s: (0.7)

2nd speed rpm : 250.0
Rack travel in mm : 3.7...3.9
Del.quantity cm3/ : 1.7...2.3

100 s: (1.5...2.5)

cm3 : 0.4Spread 100 s: (0.7)

(B) Setting of injection pump

with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 250 : 0.90...1.30 travel mm

2nd speed : 450 rpm

: 2.80...3.40 travel mm

3rd speed : 700 rpm travel mm : 4.50...5.10

4th speed : 1145 rpm

: 8.40...8.60 travel mm

5th speed : 1230 rpm travel mm : 10.10...10.50

GUIDE SLEEVE POSITION

Control-lever position Degree: -1

rpm : 1140 Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rom : 1100 Speed

Aneroid pressure h: 1200

Del.quantity 1000 : 174.0...176.0

: (171.0...179.0)

: 4.00 cm3 Spread

1000 : (7.50)

#### RATED SPEED

1st version Control lever

position degrees: 113...121

Testing:

1st rack travel in: 12.10

rpm : 1140...1150 Speed

2nd rack travel in: 4.00

rpm : 1210...1240 Speed

4th rack travel in: 1350

rom : 0.00...1.00Speed

LOW IDLE 1 Control lever

position degrees: 59...67

Testing:

Speed rpm : 100 Minimum rack trave: 5.00 rpm

Rack travel in mm : 3.70...3.90

CONSTANT REGULATION

rpm : 250...390 Speed

TORQUE CONTROL

Dimension a mm : 0.30

Torque control curve - 1st version

1st speed

st speed rpm : 1100 Rack travel in m: 13.10...13.20

: 600 2nd speed rpm

Rack travel in m: 13.40...13.50

Aneroid/Altitude Compensator Test

1st version

Setting

Speed : 500 rom hPa : 1200 Pressure

Rack travel mm : 13.40...13.50

Measurement

1/min: 500 Speed

1st pressure hPa : -

Rack travel in m: 10.00...10.20

2nd pressure hPa : 600

Rack travel in m: 12.50...12.60

3rd pressure hPa : 380 Rack travel in m: 10.80...11.00

START CUT-OUT

Speed 1/min: 170 (190)

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 1200

rpm : 600

Del.quantity cm3/: 186.0...190.0 1000 s: (183.0...193.0)

Aneroid pressure h: -

Speed rpm : 500 Del.quantity cm3/: 117.0...119.0

1000 s: (114.0...122.0)

BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 12.10

rom : 1140...1150 Speed

STARTING FUEL DELIVERY

: 100 Speed rpm

Del.quantity cm3/: 220.0...260.0 1000 s: (216.0...264.0) Rack travel in mm: 20.00...21.00

Remarks:

Delivery-valve spring pre-tension

3.2...3.4 mm.

Permissible alteration of 3.0...3.5 mm

Note remarks

Test sheet : STE 12,0 f Edition : 29.05.90

Replaces

Test oil : ISO-4113

Combination no. : 0 401 838 707

Injection pump

Pump designation : PE8P110A120LS3252

EP type number : 0 411 818 721

Governor

Governor design. : R0300/1100PA958 Governer no. : 0 421 801 522

Customer-spec. information Customer : STEYR

Engine : WD815.66

: 270.0 16% version kW : 2200 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

Test lines : 1 680 750 015

Outside diameter x Wall thickness

: 6.00X1.50X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.80...2.90 Prestroke mm

: (2.75...2.95)

Rack travel in mm : 9.00...12.00

: 1- 5- 4- 8- 6- 3-7- 2 Firing order

: 0-45-90-135-180-225-Phasina

270-315

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1100

Rack travel in mm : 13.10...13.20

Del.quantity cm3/: 17.4...17.6

100 s: (17.1...17.9)

Spread cm3 : 0.4

100 s: (0.7)

2nd speed rpm : 300.0 Rack travel in mm : 3.7...3.9 Del.quantity cm3/ : 1.7...2.3

100 s: (1.5...2.5)

Spread cm3 : 0.4100 s: (0.7)

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

Speed rpm : 600

Rack travel in mm : 15.60...16.40

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 1100 Aneroid pressure h: 1200

: 174.0...176.0 Del.quantity

1000 : (171.0...179.0) : 4.00 cm3

Spread 1000 : (7.50)

RATED SPEED

1st version

Setting point:

Speed rpm : 600 Rack travel in mm: 16.0

Testina:

1st rack travel in: 12.10

rpm : 1145...1160

2nd rack travel in: 4.00

Speed rpm : 1200...1230 4th rack travel in: 1350

rpm : 0.00...1.00Speed

LOW IDLE 1

Setting point w/out bumper spring

Speed rpm Rack travel in mm: 3.8

Testing:

rpm : 100 Speed Minimum rack trave: 5.20 Speed rpm : 300
Rack travel in mm : 3.70...3.90
Rack travel in mm : 2.00

: 340...380 Speed MOM

TORQUE CONTROL

Dimension a mm : 0.30

Torque control curve - 1st version

1st speed rpm : 1100

Rack travel in m: 13.10...13.20

2nd speed rpm : 600

Rack travel in m: 13.40...13.50

Aneroid/Altitude Compensator Test

1st version Setting

Speed

: 500 **CDIII** hPa : 1200 Pressure

: 13.40...13.50 Rack travel mm

Measurement

1/min : 500Speed

1st pressure hPa : -

Rack travel in m: 10.00...10.20

2nd pressure hPa : 600

Rack travel in m: 12.50...12.60 3rd pressure hPa : 380 Rack travel in m: 10.80...11.00

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 1200

rpm : 600

Del.quantity cm3/: 186.0...190.0 1000 s: (183.0...193.0)

Aneroid pressure h: -

rpm : 500 Speed

Del.quantity cm3/: 117.0...119.0

1000 s: (114.0...122.0)

BREAKAWAY

1st version

1mm rack travel less than

full load rack tr: 12.10

rpm : 1145...1160 Speed

STARTING FUEL DELIVERY

Speed : 100 rom

Del.quantity cm3/: 220.0...260.0 1000 s: (216.0...264.0) Rack travel in mm: 20.00...21.00

Remarks:

Delivery-valve spring pre-tension 3.2...3.4 mm.

Permissible alteration of 3.0...3.5 mm

Note remarks

: MB 11,8 f 2 Test sheet Edition : 08.06.90 : 7.4.89 Replaces Test oil : ISO-4113

Combination no. : 0 401 846 398

Injection pump

Pump designation : PE6P110A720RS371-1 EP type number : 0 411 816 166

Governor

: RQ300/1100PA424-1 Governor design. : D 421 801 395 Governer no.

Customer-spec. information

: MERCEDES-BENZ Customer

Engine : 0M355A

: 206.0 1st version kW : 2200 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 100...120

Test nozzle holder

: 0 681 343 009 assembly

Opening

: 172...175 pressure, bar

: 1 680 750 015 Test lines

Outside diameter x Wall thickness

: 6.00x1.50x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 2.80...2.90 Prestroke mm : (2.75...2.95)

Rack travel in mm : 9.00...12.00 Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 1100

Rack travel in mm : 11.70...11.80

Del.quantity cm3/: 16.0...16.2

100 s: (15.7...16.4)

cm3 : 0.4Spread

100 s: (0.8)

2nd speed rpm : 300.0 Rack travel in mm : 5.9...6.1 Del.quantity cm3/ : 1.4...2.0

100 s: (1.1...2.2)

Spread cm3 : 0.4

100 s: (0.7)

GUIDE SLEEVE POSITION Control-lever position

Degree: -2

rpm : 650 Speed

Rack travel in mm : 19.20...20.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 1100 Speed

Aneroid pressure h: 700

: 160.0...162.0 Deliguantity 1000 : (157.5...164.5)

Spread cm3 : 4.00

1000 : (8.00)

RATED SPEED

1st version

Setting point:

Speed : 650 rpm Rack travel in mm: 20.0

Testing:

1st rack travel in: 10.70

rpm : 1140...1150 Speed 2nd rack travel in: 4.00 Speed rpm : 1190...1220 4th rack travel in: 1350 Speed rpm : 0.00...1.00LOW IDLE 1 Setting point w/out bumper spring Speed rpm Rack travel in mm: 6.2 Testing: Speed rpm Minimum rack trave: 8.20 : 300 Speed rpm Rack travel in mm : 6.10...6.30 Rack travel in mm: 2.00 : 410...450 Speed COM TORQUE CONTROL Torque control curve - 1st version 1st speed rpm : 1100 Rack travel in m: 11.70...11.80 rpm : 650 2nd speed Rack travel in m: 11.70...11.90 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rom hPa : 700 Pressure : 11.70...11.80 Rack travel mm Measurement Speed  $1/\min : 500$ 1st pressure hPa : -Rack travel in m: 11.00...11.10 2nd pressure hPa : 390 Rack travel in m: 11.50...11.60 3rd pressure hPa : 350 Rack travel in m: 11.20...11.30 START CUT-OUT 1/min: 220 (240) Speed FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 700 rpm : 600 Speed Del.quantity cm3/: 156.0...160.0 1000 s: (153.0...163.0) cm3 : 6.00 Spread

1000 s: (9.00)

Aneroid pressure h: Speed rpm : 500
Del.quantity cm3/ : 135.0...137.0
1000 s: (132.0...140.0)
Spread cm3 : 6.00
1000 s: (9.00)

BREAKAWAY

1st version
1mm rack travel less than
full load rack tr: 10.70

STARTING FUEL DELIVERY

Speed

Speed rpm : 100 Del.quantity cm3/ : 120.0...145.0 1000 s: (116.0...149.0)

rpm : 1140...1150

Remarks:

Note remarks

Test sheet : DAF 11,6 x4 Edition : 10.08.90

Edition : 10.0 Replaces : -

Test oil : ISO-4113

Combination no. : 0 401 846 472Z

Injection pump

Pump designation : PE6P110A320RS407-1

EP type number : 0 411 816 147

Governor

Governor design. : R9275/1000PA641 Governer no. : 0 421 801 174

Customer spec. information Customer : DAF

Engine : DKFL1160

1st version kW : 191.0 Rated speed : 2000

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

assembly : 0 681 343 009

Openina

pressure, bar : 172...175

Test lines : 1 680 750 015

Outside diameter x Wall thickness

x Length mm : 6.00X1.50X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 2.80...2.90 : (2.75...2.95)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

BASIC SETTING

1st speed rpm: 600

Rack travel in mm : 12.80...12.90

Del.guantity cm3/: 15.1...15.3

100 s: (14.9...15.6)

Spread cm3 : 0.4

100 s: (0.7)

2nd speed rpm : 275.0 Rack travel in mm : 7.0...7.2 Del.quantity cm3/ : 0.9...1.4

100 s: (0.6...1.6)

Spread cm3 : 0.4 100 s: (0.7)

GUIDE SLEEVE POSITION

Control-lever position
Degree: -1

Speed rpm: 600

Rack travel in mm : 15.20...16.40

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 600 Aneroid pressure h: 700

Del.quantity : 151.5...153.5 1000 : (149.0...156.)

1000 : (149.0...156.0) Spread cm3 : 4.00

1000 : (7.50)

RATED SPEED

1st version

Setting point:

Speed rpm : 600 Rack travel in mm : 15.8

Testing:

1st rack travel in: 11.10

Speed rpm : 1045...1060

2nd rack travel in: 4.00

Speed rpm : 1110...1140

4th rack travel in: 1300

Speed rpm : 0.00...1.00

LOW IDLE 1 Setting point w/out bumper spring Speed rom Rack travel in mm: 7.1 Testing: Speed rpm : 100 Minimum rack trave: 8.60 Speed rpm : 275 Rack travel in mm : 7.00...7.20 Rack travel in mm: 2.00 : 350...390 Speed rom TORQUE CONTROL Dimension a mm Torque control curve - 1st version 1st speed rpm : 600 Rack travel in m: 13.00...13.10 ad speed rpm : 1000 Rack travel in m: 12.10...12.30 2nd speed rpm 3rd speed rpm : 790 Rack travel in m: 12.60...12.80 4th speed rpm : 865 Rack travel in m: 12.20...12.50 Aneroid/Altitude Compensator Test 1st version Setting : 600 Speed rpm Pressure hPa : 700 : 12.80...12.90 Rack travel mm Measurement 1/min: 600 Speed 1st pressure hPa : -Rack travel in m: 10.50...10.60 2nd pressure hPa : 190 Rack travel in m: 12.30...12.40 3rd pressure hPa : 130 Rack travel in m: 11.10...11.30 FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 700 Speed rpm : 1000 Del.quantity cm3/: 137.0...139.0 1000 s: (134.0...142.0) Omnibus Aneroid pressure h: -Speed rpm : 600 Del.quantity cm3/: 102.0...104.0 1000 s: (99.5...106.5)

BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 11.10 rpm : 1045...1060 Speed STARTING FUEL DELIVERY Speed rpm : 100 Del.quantity cm3/ : 245.0...285.0 1000 s: (241.0...289.0) Rack travel in mm : 19.50...21.00 LOW IDLE Speed 19th : 275
Rack travel in mm : 7.00...7.20
Del.quantity cm3/: 9.0...14.0 1000 s: (6.5...16.5) cm3 : 4.50Spread 1000 s: (7.50) TESTING & SETTING RACK TRAVEL SENSOR Supply voltage : 24.0 Speed : 500 COM : 700 Pressure hPa Set quantity with control lever cm3/ : 8% 11.5...11.6 Voltage : 2,800...2,820 volt : (2,790...2,830) Rack travel in part : 6.00...6.10 vole : 1,690...1,730 vole : (1,680...1,740) Voltage Remarks:

The step position of the control rod must be easily reached with the stop Lever

On activation of the starting solenoid, the start position must be reached.

APPLICATION

Note remarks

: VOL 12,2 h : 06.07.90 Test sheet Edition

Replaces

Test oil : ISO-4113

Combination no. : 0 401 846 826

Injection pump

Pump designation: PE6P120A320RS3178 EP type number : 0 411 826 752

Governor

: RQV250...1025PA921-2 Governor design.

Governer no. : 0 421 813 785

Customer-spec. information : VOLVO Customer

: Te122F3 Engine

: 287.0 : 2050 1st version kW Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 019 assembly

Openina (

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,8

Test Lines : 1 620 750 067

Outside diameter x Wall thickness

: 6.00X1.50X1000 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 3,60...3.70 : (3,55...3.75) Prestroke mm

Rack travel in mm : 9.00...12.00

: 1-5- 3- 5- 2- 4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 700 1st speed

Rack travel in mm : 14.00...14.10

Del.guantity cm3/: 25.2...25.4

100 s: (24.9...25.7)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 250.0 2nd speed Rack travel in mm: 4.8...5.7 Del.quantity cm3/: 1.8...2.3

100 s: (1.5...2.5)

cm3 : 0.5Spread

100 s: (0.7)

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

rpm : 1090 Speed

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 700 Aneroid pressure h: 1200

: 252.0...254.0 Del.quantity

1000 : (249.0...257.0)

: 5.00 cm3 Spread

1000 : (9.30)

RATED SPEED

1st version

Control lever

position degrees: 61...69

Testing:

1st rack travel in: 13.00 Speed rpm : 1055...1065

2nd rack travel in: 4.00

rpm : 1140...1170 Speed 4th rack travel in: 1250

rpm : 0.00...1.00Speed

LOW IDLE 1 Control lever

position degrees: 6...14

Testing:

: 100 Speed rpm Minimum rack trave: 6.40 : 250 rpm

Rack travel in mm : 4.80...5.10

CONSTANT REGULATION

rpm : 250...400 Speed

Aneroid/Altitude Compensator Test

1st version

Setting

: 500 Speed rpm hPa : 1200 Pressure

: 14.00...14.10 Rack travel mm

Measurement

1/min: 500 Speed

1st pressure hPa : -

Rack travel in m: 10.00...10.20

2nd pressure hPa : 120

Rack travel in m: 0.20...0.30

3rd pressure hPa : 810

Rack travel in m: 3.30...3.70

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: -

Speed rpm : 700 Del.quantity cm3/ : 163.0...165.0 1000 s: (160.0...168.0)

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 13.00

rom : 1055...1065 Speed

STARTING FUEL DELIVERY

: 100 Speed rom

Del.quantity cm3/: 220.0...240.0 1000 s: (216.0...244.0) Rack travel in mm : 20.00...21.00

LOW IDLE

Speed rpm : 250 Rack travel in mm : 4.80...5.10 Del.quantity cm3/: 18.0...23.0 1000 s: (15.5...25.5)

cm3 : 5.00 Spread 1000 s: (7.00)

Remarks:

Delivery-valve spring pre-tension = 2.40...2.60 mm.

Permissible alteration from 2.20...2.90

Note remarks

Test sheet : DAF 11,7 d8 Edition : 06.07.90 : 11.5.89 Replaces Test oil : ISO-4113

Combination no. : 0 401 846 874

Injection pump

Pump designation : PE6P120A320RS3183

: 0 411 826 754 EP type number

Governor

Governor design. : RQ250/1000PA832 : 0 421 801 368 Governer no.

Customer-spec. information Customer : DAF

: WS 259 Engine

: 259.0 1st version kW : 2000 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 019 assembly

Openina

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,8

: 1 680 750 067 Test lines

Outside diameter

x Wall thickness

: 6.00x1.50x1000 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 3.70...3.80 Prestroke mm

: (3.65...3.85)

Rack travel in mm : 9.00...12.00 : 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

BASIC SETTING

1st speed rpm: 850

Rack travel in mm : 12.80...12.90

Del.guantity cm3/: 21.3...21.5

100 s: (21.0...21.8)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 250.0 2nd speed Rack travel in mm: 6.6...7.0 Del.quantity cm3/: 1.4...2.0

100 s: (1.1...2.3) cm3 : 0.8

Spread 100 s: (1.2)

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

Speed rpm: 550 Rack travel in mm: 15.20...16.40

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 850 Speed

Aneroid pressure h: 1000 : 213.0...215.0 Del.quantity

1000 : (210.0...218.0)

: 5.00 Cm3 Spread

1000 : (9.00)

RATED SPEED

1st version

Setting point:

Speed rpm Rack travel in mm: 15.8

Testina:

1st rack travel in: 11.80 Speed rpm : 1035...1050

2nd rack travel in: 4.00

rpm : 1125...1155 Speed 4th rack travel in: 1250 rpm : 0.00...1.40

Speed

LOW IDLE 1

Setting point w/out bumper spring

rpm : 250 Speed Rack travel in mm: 6.8

Testina:

rpm : 100 Speed Minimum rack trave: 8.30 . rpm : 250

Rack travel in mm : 6.60...7.00

Rack travel in mm: 2.00

rpm : 350...390 Speed

TORQUE CONTROL

Dimension a mm

Torque control curve - 1st version

1st speed rpm : 850

Rack travel in m: 13.10...13.20

2nd speed rpm : 1000

Rack travel in m: 13.00...13.20

Aneroid/Altitude Compensator Test

1st version

Setting

: 600 Speed rom hPa : 1000 Pressure

Rack travel mm : 12.80...12.90

Measurement

1/min: 600 Speed

1st pressure hPa : -

Rack travel in m: 10.20...10.40

2nd pressure hPa : 460

Rack travel in m: 12.20...12.30

3rd pressure hPa : 250

Rack travel in m: 10.80...11.00

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: rpm : 600 Speed

Del.quantity cm3/: 145.0...147.0 1000 s: (142.0...150.0)

BREAKAWAY

1st version 1mm rack travel less than full load rack tr: 11.80

rpm : 1035...1050 Speed

STARTING FUEL DELIVERY

Speed rom

Del.quantity cm3/: 260.0...300.0 1000 s: (256.0...304.0)

LOW IDLE

Speed rpm : 250

Rack travel in mm : 6.60...7.00 Del.quantity cm3/: 14.0...20.0 1000 s: (11.0...23.0)

cm3 : 8.00 Spread

1000 s: (12.00)

Remarks:

Check electrically unlatched starting fuel delivery (EES) with 24 volt.

On activation of the starting solenoid, the start position must be reached.

Note remarks

Test sheet : MB 14,6 p 3 : 07.07.90 Edition : 2.2.90 Replaces

: ISO-4113 Test oil

Combination no. : 0 401 878 707

Injection pump

Pump designation : PE8P120A320LS3816-10

: 0 411 828 715 EP type number

Governor

Governor design. : RSV350...750P0A824-3 Governer no. : 0 421 833 229

Customer-spec. information

: MERCEDES-BENZ Customer

Engine : 0M422A

: 227.0 1st version kW Rated speed : 1500

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 100...120

Test nozzle holder

: 1 688 901 019 assembly

Openina

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,8

Test lines : 1 680 750 067

Outside diameter

x Wall thickness

: 6.00X1.50X1000 x Length mm

(A) Injection pump setting values Insp. values in parentheses

Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 4.00...4.10 Prestroke mm

: (3.95...4.15)

Rack travel in mm : 9.00...12.00 : 8-7-2-6-3-5-Firing order

: 0-45-90-135-180-225-Phasina

270-315

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 8

BASIC SETTING

1st speed rpm: 700

Rack travel in mm : 12.10...12.20

Del.quantity cm3/: 18.4...18.6

100 s: (18.1...18.9)

cm3 : 0.5Spread

100 s: (0.9)

2nd speed rpm : 350.0 Rack travel in mm: 5.3...5.6

Del.quantity cm3/: 1.6...2.2

100 s: (1.3...2.5) cm3 : 0.8 Spread

100 s: (1.2)

GUIDE SLEEVE POSITION Control-lever position

Degree: -3

rpm : 800 Rack travel in mm : 0.30...1.00

Governor spring pre-tension

Click setting x : 2.50

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 700

: 184.0...186.0 Del.quantity

1000 : (181.0...189.0)

: 5.00 Spread cm3

1000 : (9.00)

RATED SPEED

1st version

Control Lever

position degrees: 26...30

Testing:

1st rack travel in: 11.10 Speed rpm : 750...755 2nd rack travel in: 4.00 Speed rpm: 780...793

LOW IDLE 1 Control lever

position degrees: 12...20 Setting point w/out bumper spring Speed rpm : 350 Rack travel in mm : 5.4

Testing:

rpm : 100 Speed Minimum rack trave: 19.50 Speed rpm : 350 Rack travel in mm : 5.30...5.60

SET IDLE AUXILIARY SPRING Rack travel in mm : 2.00

# **BREAKAWAY**

1st version 1mm rack travel less than

full load rack tr: 11.10 Speed rpm : 750...755 Speed

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 170.0...190.0 1000 s: (166.0...194.0)

Remarks:

Observe VDT-I-420/120

Note remarks

Test sheet : MAN 11,9a13 Edition : 15.12.89 Replaces : 31.7.87

Test oil : 150-4113

Combination no. : 0 402 036 044

Injection pump

Pump designation : PES6P120A720/3LS470-

2

EP type number : 0 412 026 050

Governor

Governor design. : RQ300/1100PA658-19

Governer no. : 0 421 801 323

Customer—spec. information Customer : MAN

Engine : D2866LFZ

1st version kW : 243.0 Rated speed : 2200

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

assembly : 1 688 901 019

Openina

pressure, bar : 207...210

Test Lines : 1 680 750 067

Outside diameter x Wall thickness

x Length mm : 6.00X1.50X1000

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY
Test pressure, bar: 30...32

Prestroke mm : 2.80...2.90

: (2.75...2.95)

Rack travel in mm : 9.00...12.00

Firing order : 6-2-4-1-5-3

Phasing : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 6

BASIC SETTING

1st speed rpm: 750

Rack travel in mm : 11.30...11.40

Del.quantity cm3/: 20.7...20.9

100 s: (20.4...21.2)

Spread cm3: 0.5

100 s: (0.9)

2nd speed rpm: 300.0 Rack travel in mm: 4.6...4.8

Del.quantity cm3/: 1.2...1.8

100 s: (0.9...2.1) pread cm3 : 0.8

Spread cm3 : 0.8 100 s: (1.2)

GUIDE SLEEVE POSITION Control-lever position

Degree: -2 rpm : 600

Rack travel in mm : 19.20...20.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 750 Aneroid pressure h: 1000

Del.quantity : 207.0...209.0 1000 : (204.0...212.0)

Spread cm3 : 5.00

1000 : (9.00)

RATED SPEED

1st version

Setting point:

Speed rpm : 600 Rack travel in mm : 20.0

Testing:

1st rack travel in: 9.50

Speed rpm : 1145...1160

2nd rack travel in: 4.00

rpm : 1185...1215 Speed 4th rack travel in: 1300 rpm : 0.00...1.00Speed LOW IDLE 1 Setting point w/out bumper spring Speed rpm Rack travel in mm: 4.7 Testing: : 100 Speed man Minimum rack trave: 6.20 : 300 Speed man Rack travel in mm : 4.60...4.80 Rack travel in mm : 2.00 : 340...380 Speed rpm TORQUE CONTROL Dimension a mm : 0.50 Torque control curve - 1st version 1st speed rpm : 1100 Rack travel in m: 11.70...11.80 : 750 2nd speed rpm Rack travel in m: 11.90...12.20 rpm : 875 3rd speed Rack travel in m: 11.80...12.00 : 950 4th speed rpm Rack travel in m: 11.20...11.50 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm Pressure hPa : 1000 : 11.30...11.40 Rack travel mm Measurement Speed  $1/\min : 500$ 1st pressure hPa : -Rack travel in m: 8.90...9.10 2nd pressure hPa : 85 Rack travel in m: 9.30...9.40 3rd pressure hPa : 280 Rack travel in m: 10.50...10.90 START CUT-OUT

1/min: 220 (240)

FUEL DELIVERY CHARACTERISTICS

rpm : 1100

Aneroid pressure h: 1000

Del.quantity cm3/: 203.0...207.0 1000 s: (200.0...210.0) Aneroid pressure h: 1000 : 650 Speed rom Del.quantity cm3/: 208.0...214.0 1000 s: (205.0...217.0) Aneroid pressure h: 280 Speed rpm : 500 Del.quantity cm3/: 184.0...196.0 1000 s: (181.0...199.0) Aneroid pressure h: -: 500 Speed rpm Del.quantity cm3/: 132.0...134.0 1000 s: (129.0...137.0) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 9.50 rpm : 1145...1160 Speed STARTING FUEL DELIVERY Speed rpm Del.quantity cm3/: 225.0...245.0 1000 s: (221.0...249.0) LOW IDLE : 300 Speed rpm Rack travel in mm : 4.60...4.80 Del.quantity cm3/: 12.0...18.0 1000 s: (9.0...21.0) : 8.00 Spread cm3 1000 s: (12.00) Remarks: : MAN-NR. 2-7756

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1st version

Speed

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks Test sheet : MAN 11,9 u1 : 20.07.90 Edition Replaces : ISO-4113 Test oil Combination no. : 0 402 036 740 Injection pump Pump designation : PES6P120A720/3LS3255 : 0 412 026 741 EP type number Governor Governor design. : RQ300/1000PA813-13 : 0 421 801 529 Governer no. Customer-spec. information : MAN Customer Engine : D2866LF03 1st version kW : 273.0 : 2000 Rated speed TEST BENCH REQUIREMENTS Test oil inlet temp. °C : 38...42 Overflow valve : 1 417 413 025 Inlet press., bar: 1.50 Test nozzle holder : 1 688 901 019 assembly Opening : 207...210 pressure, bar Orifice plate diameter mm : 0,6 Test lines : 1 680 750 067 Outside diameter x Wall thickness : 6.00x1.50x1000 x Length mm (A) Injection pump setting values Insp. values in parentheses

Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 30...32

Prestroke mm : 3.70...3.80 : (3.65...3.85) Rack travel in mm : 14.50...15.50 Firing order : 6-2-4-1-5-3 : 0-60-120-180-240-300 Phasing Tolerance + - ° : 0.50 (0.75) Time to cyl. no. : 6 BASIC SETTING 1st speed rpm: 700 Rack travel in mm : 15.00...15.10 Del.quantity cm3/: 24.2...24.4 100 s: (23.9...24.7) Spread cm3 : 0.5100 s: (0.9) 2nd speed rpm : 300.0 Rack travel in mm : 4.9...5.3 Del.quantity cm3/: 1.7...2.3 100 s: (1.4...2.6) cm3 : 0.8Spread 100 s: (1.2) GUIDE SLEEVE POSITION Control-lever position Degree: -2 rpm : 550 Speed Rack travel in mm : 19.20...20.80 FULL LOAD DELIV. AT FULL LOAD STOP 1st version Speed rpm : 700 Aneroid pressure h: 1200 : 242.0...244.0 Del.quantity 1000 : (239.0...247.0) cm3 : 5.00 Spread 1000 : (9.00) RATED SPEED 1st version Setting point: Speed rpm : 550 Rack travel in mm : 20.0

1st rack travel in: 13.80

rpm : 1045...1060 Speed 2nd rack travel in: 4.00 Speed rpm : 1160...1190 4th rack travel in: 1300 rpm : 0.00...1.00Speed LOW IDLE 1 Setting point w/out bumper spring : 300 rpm Rack travel in mm: 5.0 Testina: Speed : 200 rpm Minimum rack trave: 6.50 rom : 300 Speed Rack travel in mm : 4.90...5.10 Rack travel in mm : 2.00 : 360...400 Speed המכיז TORQUE CONTROL Torque control curve - 1st version st speed rpm : 1000 Rack travel in m: 14.80...14.90 1st speed 2nd speed rpm : 700 Rack travel in m: 15.30...15.50 Aneroid/Altitude Compensator Test 1st version Settina : 500 Speed rom Pressure hPa : 1200 Rack travel mm : 15.00...15.10 Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 11.70...11.90 2nd pressure hPa : 110 Rack travel in m: 12.00...12.10 3rd pressure hPa : 470 Rack travel in m: 13.70...14.10 START CUT-OUT 1/min: 220 (240) Speed FUEL DELIVERY CHARACTERISTICS

1st version Aneroid pressure h: 1200 Speed rpm : 1000 Del.quantity cm3/: 236.0...242.0 1000 s: (233.0...245.0) Speed rpm : 700

Del.quantity cm3/: 89.0...99.0 1000 s: (86.0...102.0) Aneroid pressure h: -Speed rpm: 500
Del.quantity cm3/: 134.0...136.0
1000 s: (131.0...139.0) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 13.80 rpm : 1045...1060 Speed INTERMEDIATE RATED SPEED Rack travel in mm: 4.00 STARTING FUEL DELIVERY Speed rpm : 100 Del.quantity cm3/ : 220.0...240.0 1000 s: (216.0...244.0) LOW IDLE Speed rpm : 300 Rack travel in mm : 4.90...5.30

Del.quantity cm3/: 17.0...23.0 1000 s: (14.0...26.0) cm3 : 8.00 Spread 1000 s: (12.00)

Remarks:

: MAN-NR. 0-7050 Setting and blocking of pointer of start-of-delivery sensor on cyl. 6 start of delivery

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks

: MAN 11,9 U Test sheet Edition : 19.06.90 Replaces

: ISO-4113 Test oil

Combination no. : 0 402 036 741

Injection pump

Pump designation : PES6P120A720/3LS3255

EP type number : 0 412 026 739

Governor

Governor design. : RQV300...1000PA876-6

: 0 421 813 866 Governer no.

Customer-spec. information : MAN Customer

Engine : D2866LF03

1st version kW : 273.0 : 2000 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 019 assembly

Opening

: 207...210 pressure, bar

Orifice plate

: 0,8 diameter mm

Test lines : 1 680 750 067

Outside diameter

x Wall thickness

x Length mm : 6.00x1.50x1000

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values \_\_\_\_

BEGINNING OF DELIVERY Test pressure, bar: 30...32

: 3.70...3.80 Prestroke mm

: (3.65...3.85)

Rack travel in mm : 14.50...15.50

Firing order : 6-2-4-1-5-3

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 6

BEGINNING OF DELIVERY DIFFERENCE

betw. rack trav. m: 5.90...6.10 & maximum rack tra: 14.5...15.5 Difference ° CS : 2.00...4.00

BASIC SETTING

1st speed rpm: 700

Rack travel in mm : 15.00...15.10

Del.guantity cm3/: 24.2...24.4

100 s: (23.9...24.7)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 300.0 2nd speed Rack travel in mm: 4.7...5.1 Del.quantity cm3/: 1.7...2.3

100 s: (1.4...2.6)

cm3 : 0.8Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 1045

: 9.90...10.10 travel mm

2nd speed : 300 rom

: 1.50...1.70 travel mm

3rd speed : 500 rpm

travel mm : 3.30...3.90

: 800 4th speed rpm

: 6.80...7.20 travel mm rpm : 1300 5th speed

: 13.00...14.00 travel mm

GUIDE SLEEVE POSITION Control-Lever position

Degree: -1

rpm : 1060Speed Rack travel in mm : 15.20...17.80 FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 700 Aneroid pressure h: 1200

Del.quantity : 242.0...244.0

1000 : (239.0...247.0)

Spread cm3 : 5.00 1000 : (9.00)

RATED SPEED

1st version Control Lever

position degrees: 298...306

Testina:

1st rack travel in: 13.60

rpm : 1040...1050 Speed

2nd rack travel in: 4.00

Speed rpm: 1125...1155 4th rack travel in: 1300

Speed rpm : 0.00...1.00

LOW IDLE 1 Control Lever

position degrees: 256...264

Testing:

Speed : 200 rom Minimum rack trave: 6.40 : 300 rom

Rack travel in mm : 4.80...5.00

CONSTANT REGULATION

rpm : 290...400 Speed

TORQUE CONTROL

Torque control curve - 1st version

rpm : 700 1st speed

Rack travel in m: 15.00...15.10 2nd speed rpm : 1000 Rack travel in m: 14.60...14.70

Aneroid/Altitude Compensator Test

1st version

Setting

: 500 Speed rpm hPa : 1200 Pressure

: 15.00...15.10 Rack travel mm

Measurement

1/min: 500 Speed

1st pressure hPa : -

Rack travel in m: 11.70...11.90

2nd pressure hPa : 110

Rack travel in m: 12.00...12.10

3rd pressure hPa : 470

Rack travel in m: 14.00...14.40

START CUT-OUT

1/min: 220 (240) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 1200 rpm : 1000 Speed

Del.quantity cm3/: 236.0...242.0 1000 s: (233.0...245.0)

: 700 rpm

Del.quantity cm3/: 95.0...101.0

1000 s: (92.0...104.0)

Aneroid pressure h: -

rpm : 500 Speed

Del.quantity cm3/: 134.0...136.0 1000 s: (131.0...139.0)

BREAKAWAY

1st version

1mm rack travel less than

full load rack tr: 13.60

Speed rom : 1040...1050

INTERMEDIATE RATED SPEED

Rack travel in mm: 4.00

STARTING FUEL DELIVERY

Speed rpm

Del.quantity cm3/: 210.0...230.0 1000 s: (206.0...234.0)

LOW IDLE

Speed : 300 rpm

Rack travel in mm : 4.70...5.10 Del.quantity cm3/: 17.0...23.0 1000 s: (14.0...26.0)

cm3 : 8.00 Spread

1000 s: (12.00)

Remarks:

: MAN-NR, 0-7051

Setting and blocking of pointer of start-of-delivery sensor on cyl. 6

start of delivery

Note remarks

: MAN 11,1q29 Test sheet : 07.08.90 Edition Replaces : 10.85 : ISO-4113 Test oil

Combination no. : 0 402 046 204

Injection pump

Pump designation : PES6P120A720LS388 : 0 412 026 030 EP type number

Governor

Governor design. : RQV250...1100PA504

Customer-spec. information Customer : MAN

: D2566MKF Engine

1st version kW : 206.0 : 2200 Rated speed

TEST BENCH REQUIREMENTS

Test oil

: 38...42 inlet temp. °C

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 019 assembly

Openina

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,8

Test lines : 1 680 750 067

Outside diameter x Wall thickness

: 6.00x1.50x1000 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

: 3.00...3.10 Prestroke mm

: (2.95...3.15)

Rack travel in mm : 9.00...12.00 : 6-2-4-1-5-3 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 6

BASIC SETTING

rpm: 750 1st speed

Rack travel in mm : 11.40...11.50

Del.quantity cm3/: 17.8...18.0

100 s: (17.5...18.3)

Spread cm3 : 0.5

100 s: (0.9)

rpm : 250.0 2nd speed Rack travel in mm: 6.2...6.4 Del.quantity cm3/: 1.2...1.8

100 s: (0.9...2.1)

cm3 : 0.8 Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 300 1st speed

: 1.80...2.10 travel mm rpm : 800 2nd speed

: 5.30...5.60 travel mm

rpm : 1100 3rd speed

travel mm : 7.80...8.00

GUIDE SLEEVE POSITION

Control-lever position Degree: -1

rpm : 1130

Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 750 Aneroid pressure h: 700

: 178.0...180.0 Del.quantity 1000 : (175.0...183.0)

: 5.00 cm3 Spread

RATED SPEED

1st version

Control lever

position degrees: 62...70

Testing:

1st rack travel in: 9.20

rpm : 1140...1150 Speed

2nd rack travel in: 4.00

rpm : 1210...1240 Speed

4th rack travel in: 1400

rpm : 0.00...1.00Speed

LOW IDLE 1

Control lever

position degrees: 8...16

Testina:

Speed : 100 rpm

Minimum rack trave: 7.80 rpm : 250

Speed Rack travel in mm : 6.20...6.40

CONSTANT REGULATION

rpm : 365...480 Speed

TORQUE CONTROL

Dimension a mm : 1.20

Torque control curve - 1st version

rpm : 750 1st speed

Rack travel in m: 11.40...11.50

rpm : 1100 2nd speed

Rack travel in m: 10.20...10.30

3rd speed rpm : 900

Rack travel in m: 11.00...11.20 4th speed rpm : 1000

Rack travel in m: 10.30...10.60

Aneroid/Altitude

Compensator Test

1st version

Setting

Speed : 500 rpm hPa : 700 Pressure

: 11.40...11.50 Rack travel mm

Measurement

1/min: 500 Speed

1st pressure hPa : -

Rack travel in m: 9.20...9.30

2nd pressure hPa : 310

Rack travel in m: 10.30...10.40

3rd pressure hPa : 430

Rack travel in m: 10.90...11.10

START CUT-OUT

1/min: 170 (190) Speed

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 700

Speed rpm : 1100 Del.quantity cm3/ : 160.0...166.0 1000 s: (157.0...169.0)

Aneroid pressure h: 700

Speed : 650 rpm

Del.quantity cm3/: 171.0...177.0 1000 s: (168.0...180.0)

Aneroid pressure h: 310 Speed rpm: 500 Del.quantity cm3/: 131.0...137.0

1000 s: (128.0...140.0)

Aneroid pressure h: -

rpm : 500 Speed

Del.quantity cm3/: 104.0...106.0 1000 s: (101.0...109.0)

BREAKAWAY

1st version

1mm rack travel less than

full load rack tr: 9.20

Speed rpm : 1140...1150

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 205.0...225.0

1000 s: (201.0...229.0)

LOW IDLE

Speed rpm : 250 Rack travel in mm : 6.20...6.40

Del.quantity cm3/: 12.0...18.0

1000 s: (9.0...21.0)

: 8.00 Spread cm3

1000 s: (12.00)

Remarks:

: MAN-NR. 2-7113

Note remarks

Test sheet : MAN 11,1a33 Edition : 07.08.90

Replaces

: ISO-4113 Test oil

: 0 402 046 205 Combination no.

Injection pump

Pump designation : PES6P120A720LS388 : 0 412 026 030 EP type number

Governor

Governor design. : RQV250...1100PA504

Customer-spec. information Customer : MAN

Engine : D2566MKF

: 206.0 1st version kW : 2200 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 1 417 413 025

Inlet press., bar: 1.50

Test nozzle holder

: 1 688 901 019 assembly

Opening

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,8

Test lines : 1 680 750 067

Outside diameter

x Wall thickness

: 6.00x1.50x1000 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 25...27

Prestroke mm : 3.00...3.10

: (2.95...3.15)

Rack travel in mm : 9.00...12.00 : 6-2-4-1-5-3 Firing order

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 6

BASIC SETTING

rpm: 750 1st speed

Rack travel in mm : 11.40...11.50

Del.quantity cm3/: 17.8...18.0

100 s: (17.5...18.3)

cm3 : 0.5Spread

100 s: (0.9)

2nd speed rpm : 250.0Rack travel in mm: 6.2...6.4

Del.quantity cm3/: 1.2...1.8 100 s: (0.9...2.1)

cm3 : 0.8Spread

100 s: (1.2)

(B) Setting of injection pump

with governor

GUIDE SLEEVE TRAVEL

rpm : 300 1st speed

: 1.80...2.10 travel mm

rpm : 800 2nd speed

5.30...5.60 1100 travel mm

3rd speed rpm

: 7.80...8.00 travel mm

GUIDE SLEEVE POSITION

Control-lever position

Degree: -1

Speed rpm : 1130 Rack travel in mm : 15.20...17.80

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 750 Speed

Aneroid pressure h: 700

178.0...180.0 Del.quantity

1000 : (175.0...183.0)

: 5.00 Spread cm3

RATED SPEED 1st version Control lever position degrees: 62...70 Testina: 1st rack travel in: 9.20 Speed rpm : 1140...1150 2nd rack travel in: 4.00 rpm : 1210...1240 Speed 4th rack travel in: 1400 Speed rpm : 0.00...1.00LOW IDLE 1 Control lever position degrees: 8...16 Testing: rpm : 100 Speed Minimum rack trave: 7.80 rpm : 250 Rack travel in mm : 6.20...6.40 CONSTANT REGULATION rpm : 365...480 Speed TORQUE CONTROL Dimension a mm : 1.20 Torque control curve - 1st version 1st speed rpm : 750 Rack travel in m: 11.40...11.50 od speed rpm : 1100 Rack travel in m: 10.20...10.30 2nd speed 3rd speed rpm : 900 Rack travel in m: 11.00...11.20 4th speed rpm : 1000 Rack travel in m: 10.30...10.60 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm Pressure hPa : 700 : 11.40...11.50 Rack travel mm Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 9.20...9.30

1/min: 170 (190) Speed FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 700 Speed rpm : 1100 Del.quantity cm3/ : 160.0...166.0 1000 s: (157.0...169.0) Aneroid pressure h: 700 : 650 Speed rpm Del.quantity cm3/: 171.0...177.0 1000 s: (168.0...180.0) Aneroid pressure h: 310 Speed rpm : 500 Del.quantity cm3/: 131.0...137.0 1000 s: (128.0...140.0) Aneroid pressure h: rpm : 500 Speed Del.quantity cm3/: 104.0...106.0 1000 s: (101.0...109.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 9.20 rpm : 1140...1150 Speed STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 205.0...225.0 1000 s: (201.0...229.0) LOW IDLE rpm : 250 Speed Rack travel in mm : 6.20...6.40 Del.quantity cm3/: 12.0...18.0 1000 s: (9.0...21.0) Spread cm3 : 8.001000 s: (12.00) Remarks: : MAN-NR. 2-7111

START CUT-OUT

2nd pressure hPa : 310

3rd pressure hPa : 430

Rack travel in m: 10.30...10.40

Rack travel in m: 10.90...11.10

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks Test sheet : MAN 11,1q32 Edition : 02.01.90 : 11.1.88 Replaces Test oil : ISO-4113 Combination no. : 0 402 046 209 Injection pump Pump designation : PES6P120A720LS388 : 0 412 026 030 EP type number Governor : RQ250/1100PA509 Governor design. : 0 421 801 117 Governer no. Customer-spec. information Customer : MAN : D2566MK Engine : 206.0 1st version kW Rated speed : 2200 TEST BENCH REQUIREMENTS Test oil inlet temp. °C : 38...42 Overflow valve : 1 417 413 025 Inlet press., bar: 1.50 Test nozzle holder : 1 688 901 019 assembly Opening. pressure, bar : 207...210 Orifice plate diameter mm : 0,8 Test lines : 1 680 750 067 Outside diameter x Wall thickness : 6.00x1.50x1000 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values \_\_\_ BEGINNING OF DELIVERY Test pressure, bar: 25...27 L16

Prestroke mm : 3.00...3.10 : (2.95...3.15)

Rack travel in mm : 9.00...12.00

Firing order : 6-2-4-1-5-3 Phasing : 0-60-120-180-240-300 Tolerance + - ° : 0.50 (0.75) Time to cyl. no. : 6 BASIC SETTING rpm : 750 1st speed Rack travel in mm : 11.40...11.50 Del.quantity cm3/: 17.8...18.0 100 s: (17.5...18.3) cm3 : 0.5Spread 100 s: (0.9) rpm : 250.0 2nd speed Rack travel in mm : 6.2...6.4 Del.quantity cm3/: 1.2...1.8 100 s: (0.9...2.1) cm3 : 0.8 Spread 100 s: (1.2) GUIDE SLEEVE POSITION Control-lever position Degree: -2 Speed rpm : 600 Rack travel in mm : 19.20...20.80 FULL LOAD DELIV. AT FULL LOAD STOP 1st version Speed rpm 2 750 Aneroid pressure h: 700 : 178.0...180.0 Del.quantity 1000 : (175.0...183.0) : 5.00 cm3 Spread 1000 : (9.00) RATED SPEED 1st version Setting point: Speed : 600 rpm Rack travel in mm: 20.0

1st rack travel in: 9.20

rpm : 1145...1160 Speed 2nd rack travel in: 4.00 rpm : 1180...1210 Speed 4th rack travel in: 1400 rom : 0.00...1.00 Speed LOW IDLE 1 Setting point w/out bumper spring : 250 rpm Rack travel in mm: 6.3 Testing: rpm : 100 Speed Minimum rack trave: 7.80 rpm : 250 Speed Rack travel in mm : 6.20...6.40 Rack travel in mm : 2.00 rpm : 335...375 Speed TORQUE CONTROL Dimension a mm : 0.50Torque control curve - 1st version 1st speed rpm : 750 Rack travel in m: 11.40...11.50 and speed rpm : 1100 Rack travel in m: 10.20...10.30 2nd speed 3rd speed rpm : 875 Rack travel in m: 11.10...11.30 4th speed rpm : 985 Rack travel in m: 10.40...10.70 Aneroid/Altitude Compensator Test 1st version Setting : 500 Speed rpm hPa : 700 Pressure : 11.40...11.50 Rack travel mm Measurement 1/min: 500 Speed 1st pressure hPa : -Rack travel in m: 9.20...9.30 2nd pressure hPa : 310 Rack travel in m: 10.30...10.40 3rd pressure hPa : 430 Rack travel in m: 10.90...11.10 START CUT-OUT 1/min: 170 (190) Speed FUEL DELIVERY CHARACTERISTICS 1st version

1mm rack travel less than

full load rack tr: 9.20 Speed rpm : 1145...1160

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 205.0...225.0 1000 s: (201.0...229.0)

LOW IDLE

Remarks:

: MAN-NR. 2-7066

Aneroid pressure h: 700

Note remarks

: MAC 11.1 a : 04.09.90 : 02.05.90 Test sheet Edition Replaces : ISO-4113 Test oil

Combination no. : 0 402 746 810

Injection pump

Pump designation : PES6P120A720RS7135 : 0 412 726 807

EP type number

Governor

Governor design. : RQV325...900PA848K

: 0 421 815 168 Governer no.

Customer-spec. information

Customer : MACK TRUCKS

: E6 350 4VH Engine

: 261.0 1st version kW : 1800 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

**Overflow** 

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Openina

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

: 1 680 750 008 Test lines

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 Prestroke mm

: (2.70...2.90)

Rack travel in mm : 9.00...12.00 Firing order : 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 900 1st speed

Rack travel in mm : 13.90...14.00

Del.quantity cm3/: 23.6...23.8

100 s: (23.3...24.1)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.0 2nd speed

Rack travel in mm : 4.0...4.2 Del.guantity cm3/: 3.2...3.8

100 s: (3.0...4.0)

Spread cm3 : 0.8

100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

: 1.20...1.40 travel mm

2nd speed : 450 rpm

: 3.10...3.30 travel mm

: 850 3rd speed rpm

: 5.90...6.10 travel mm

4th speed : 1000 rpm

: 7.50...7.70 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 900 Speed

Aneroid pressure h: 900

: 236.5...238.5 Del.quantity

1000 : (233.5...241.5)

: 5.00 Spread cm3 1000 : (9.00)

# RATED SPEED 1st version Control lever position degrees: 53...61 Testing: 1st rack travel in: 12.90 rpm : 950...960 Speed 2nd rack travel in: 4.00 rpm : 1075...1105 Speed 4th rack travel in: 1250 rpm : 0.00...1.00Speed LOW IDLE 1 Control lever position degrees: 7...15 Testing: Speed rpm : 275 Minimum rack trave: 5.60 rpm Rack travel in mm : 4.00...4.20 CONSTANT REGULATION : 325...520 Speed רוסח TORQUE CONTROL Dimension a mm : ? Torque control curve - 1st version rpm : 900 1st speed Rack travel in m: 13.90...14.00 2nd speed : 625 rpm Rack travel in m: 14.10...14.20 3rd speed rpm : 800 Rack travel in m: 14.00...14.10 : 500 4th speed rpm Rack travel in m: 0.00...13.50 Aneroid/Altitude Compensator Test 1st version Setting : 625 Speed rpm hPa : 900 Pressure : 14.10...14.20 Rack travel mm Measurement 1/min: 625 Speed 1st pressure hPa : -Rack travel in m: 8.50...8.90 2nd pressure hPa : 275

1st version Aneroid pressure h: 900 Speed rpm : 625 Del.quantity cm3/: 257.0...263.0 1000 s: (254.0...266.0) cm3 : 8.00 Spread 1000 s: (12.0) Aneroid pressure h: 900 Speed rpm : 850 Del.quantity cm3/: 159.0...161.0 \* 1000 s: (141.5...162.5) Aneroid pressure h: -Speed rpm : 400 Del.quantity cm3/: 142.0...146.0 1000 s: (140.0...148.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 12.90 Speed rpm : 950...960 STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 170.0...210.0 1000 s: (160.0...220.0) Rack travel in mm : 8.50...8.90 LOW IDLE Speed rpm : 325
Rack travel in mm : 4.00...4.20 Del.quantity cm3/: 32.0...38.0 1000 s: (30.0...40.0) Spread cm3 : 8.001000 s: (12.00) Remarks: : MACK # 313GC5173P10 \* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1

start of delivery

3rd pressure hPa : 570

Rack travel in m: 10.00...10.10

Rack travel in m: 12.30...12.70

#### Note remarks

: MAC 11,1 a1 Test sheet Edition : 04.09.90 : 02.05.90 Replaces Test oil : ISO-4113

Combination no. : 0 402 746 814

Injection pump

Pump designation : PES6P120A720RS7135 EP type number : 0 412 726 807

Governor

Governor design. : RQV325...850PA848-1K

: 0 421 815 169 Governer no.

Customer-spec. information

Customer : MACK TRUCKS

: E6 300 4VH Engine

1st version kW : 224.0 : 1700 Rated speed

# TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

**Opening** 

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 Prestroke mm : (2.70...2.90)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

BASIC SETTING

rpm: 850 1st speed

Rack travel in mm : 12.90...13.00

Del.quantity cm3/: 20.0...20.2

100 s: (19.7...20.5)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.0 2nd speed

Rack travel in mm: 4.5...4.7 Del.quantity cm3/: 3.2...3.8

100 s: (3.0...4.0)

Spread cm3 : 0.8

100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed

rpm : 325 : 1.20...1.40 travel mm

rpm : 450 2nd speed

: 2.80...3.10 travel mm

rpm : 850 3rd speed

: 6.20...6.40 travel mm

: 1000 4th speed rpm

: 7.70...7.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 850 Speed

Aneroid pressure h: 900

Del.quantity : 200.5...202.5 1000 : (197.5...205.5) Spread cm3 : 5.00

RATED SPEED 1st version Control lever position degrees: 52...60 Testing: 1st rack travel in: 11.90 rpm : 900...910 Speed 2nd rack travel in: 4.00 rpm : 1025...1055 Speed 4th rack travel in: 1100 rpm : 0.00...1.00LOW IDLE 1 Control lever position degrees: 7...15 Testing: Speed rom Minimum rack trave: 6.10 rpm : 325 Rack travel in mm : 4.50...4.70 CONSTANT REGULATION : 325...520 Speed rom TORQUE CONTROL Dimension a mm Torque control curve - 1st version 1st speed rpm : 850 Rack travel in m: 12.90...13.00 2nd speed : 700 rpm Rack travel in m: 13.30...13.50 3rd speed rpm : 600 Rack travel in m: 13.50...13.70 : 500 4th speed rpm Rack travel in m: 0.00...13.10 Aneroid/Altitude Compensator Test 1st version Setting : 600 Speed rpm hPa : 900 Pressure : 13.50...13.70 Rack travel mm Measurement Speed 1/min: 600 1st pressure hPa : -Rack travel in m: 9.90...10.30 2nd pressure hPa : 250 Rack travel in m: 10.90...11.00 3rd pressure hPa : 475

Rack travel in m: 12.60...13.00

FUEL DELIVERY CHARACTERISTICS

1st version Aneroid pressure h: 900 Speed rpm : 700
Del.quantity cm3/ : 217.0...223.0
1000 s: (214.0...226.0) Aneroid pressure h: 900 Speed rpm : 600 Del.quantity cm3/: 233.0...239.0 1000 s: (230.0...242.0) cm3 : 8.00 Spread 1000 s: (12.0) Aneroid pressure h: 900 Speed rpm : 850 Del.quantity cm3/ : 159.0...161.0 \* 1000 s: (141.5...162.5) Aneroid pressure h: rpm : 400 Speed Del.quantity cm3/: 154.0...158.0 1000 s: (152.0...160.0) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 11.90 rpm : 900...910 Speed STARTING FUEL DELIVERY Speed : 100 rpm Del.quantity cm3/: 195.0...235.0 1000 s: (185.0...245.0) Rack travel in mm : 9.90...10.30 LOW IDLE rpm : 325 Speed Rack travel in mm : 4.50...4.70 Del.quantity cm3/: 32.0...38.0 1000 s: (30.0...40.0) Spread cm3 : 8.00 1000 s: (12.00) Remarks: : MACK # 313GC5173P6

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

Setting and blocking of pointer of

start-of-delivery sensor on cyl. 1 start of delivery

#### Note remarks

Test sheet : MAC 11,1 a2 Edition : 04.09.90 Replaces : 02.05.90 Test oil : ISO-4113

Combination no. : 0 402 746 815

Injection pump

Pump designation : PES6P120A720RS7135 EP type number : 0 412 726 807

Governor

Governor design. : RQV325...850PA848-2K

Governer no. : 0 421 815 170

Customer-spec. information Customer : MACK TRUCKS

Engine : E6 275 4VH

1st version kW : 202.0 Rated speed : 1700

## TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

assembly : 1 688 901 101

**Opening** 

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test Lines : 1 680 750 008

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

Prestroke mm : 2.75...2.85

: (2.70...2.90) Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

# BASIC SETTING

1st speed rpm: 850

Rack travel in mm : 12.00...12.10

Del.quantity cm3/: 18.1...18.3

100 s: (17.8...18.6)

Spread cm3 : 0.5

100 s: (0.9)

2nd speed rpm : 325.0
Rack travel in mm : 4.5...4.7
Del.quantity cm3/: 3.2...3.8

100 s: (3.0...4.0)

Spread cm3 : 0.8 100 s: (1.2)

# (B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm: 325

travel mm : 1.20...1.40

2nd speed rpm: 450

travel mm : 2.80...3.10

3rd speed rpm : 850

travel mm : 6.20...6.40

4th speed rpm : 1000

travel mm : 7.70...7.90

# FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm: 850 Aneroid pressure h: 900

Del.quantity : 181.0...183.0

1000 : (178.0...186.0)

Spread cm3 : 5.00 1000 : (9.00)

#### RATED SPEED

1st version Control lever

position degrees: 52...60

Testina:

1st rack travel in: 11.00 rpm : 900...910 Speed

2nd rack travel in: 4.00

rpm : 1025...1055 Speed

4th rack travel in: 1150

rpm : 0.00...1.00Speed

LOW IDLE 1 Control Lever

position degrees: 7...15

Testina:

: 275 Speed rpm Minimum rack trave: 6.10 rpm : 325 Speed

Rack travel in mm : 4.50...4.70

CONSTANT REGULATION

: 325...520 Speed rom

TORQUE CONTROL

Dimension a mm :?

Torque control curve - 1st version

rpm : 850 1st speed

Rack travel in m: 12.00...12.10

2nd speed rpm : 600

Rack travel in m: 12.60...12.70

3rd speed rpm : 700

Rack travel in m: 12.50...12.70 th speed rpm : 500

4th speed

Rack travel in m: 0.00...12.40

Aneroid/Altitude Compensator Test

1st version

Setting

Speed : 600 rpm Pressure hPa : 900

: 12.60...12.70 Rack travel mm

Measurement

1/min: 600 Speed

1st pressure hPa : -

Rack travel in m: 9.50...9.90

2nd pressure hPa : 215

Rack travel in m: 10.30...10.40

3rd pressure hPa : 360 Rack travel in m: 11.50...11.90

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 900

: 600 rpm

Del.quantity cm3/: 210.5...216.5 1000 s: (207.5...219.5)

cm3 : 8.00Spread

1000 s: (12.0)

Aneroid pressure h: 900 : 850 Speed rpm

Del.quantity cm3/: 159.0...161.0 \*

1000 s: (141.5...162.5)

Aneroid pressure h: -

Speed rpm : 400 Del.quantity cm3/: 144.0...148.0 1000 s: (142.0...150.0)

## BREAKAWAY

1st version

1mm rack travel less than

full load rack tr: 11.00

rpm : 900...910 Speed

STARTING FUEL DELIVERY

: 100 rpm

Del.quantity cm3/: 160.0...200.0

1000 s: (150.0...210.0)

Rack travel in mm : 9.50...9.90

LOW IDLE

Speed rpm : 325 Rack travel in mm : 4.50...4.70

Del.quantity cm3/: 32.0...38.0 1000 s: (30.0...40.0)

Spread cm3 : 8.00

1000 s: (12.00)

Remarks:

: MACK # 313GC5173P2

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection pump test bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Note remarks

: MAC 11,1 a3 : 04.09.90 Test sheet Edition : 02.05.90 Replaces

: ISO-4113 Test oil

: 0 402 746 816 Combination no.

Injection pump

Pump designation : PES6P120A720RS7135

: 0 412 726 807 EP type number

Governor

: RQV325...875PA848-3K Governor design.

: 0 421 815 171 Governer no.

Customer-spec, information

: MACK TRUCKS Customer

Engine : EM6-250L 4VH

1st version kW : 186.0 : 1750 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Openina

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter

x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 : (2.70...2.90) Prestroke mm

Rack travel in mm : 10.50

: 1-5- 3- 6- 2- 4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 875

Rack travel in mm: 10.80...10.90

Del.quantity cm3/: 16.3...16.5

100 s: (16.0...16.8)

Spread cm3 : 0.5

100 s: (0.9)

rpm : 325.0 2nd speed

Rack travel in mm: 4.5...4.7 Del.quantity cm3/: 3.9...4.5

100 s: (3.7...4.7)

cm3 : 0.8Spread

100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 325

travel mm : 1.20...1.40

2nd speed : 450 rpm

: 2.80...3.20 : 850 travel mm

3rd speed rpm

: 6.20...6.40 travel mm

4th speed : 1000 rpm

: 7.70...7.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 875 Aneroid pressure h: 1200

Del.quantity : 163.0...165.0

1000 : (160.0...168.0)

: 5.00 Spread cm3

#### RATED SPEED

1st version Control Lever

position degrees: 52...60

Testina:

1st rack travel in: 9.80

rpm : 925...935 Speed

2nd rack travel in: 4.00

rpm : 1010...1040 Speed

4th rack travel in: 1100

Speed rpm : 0.00...1.00

LOW IDLE 1

Control Lever

position degrees: 9...17

Testing:

Speed rpm : 275

Minimum rack trave: 6.10 Speed rpm : 325

Rack travel in mm : 4.50...4.70

CONSTANT REGULATION

Speed : 325...520 rom

TORQUE CONTROL

Dimension a mm :?

Torque control curve - 1st version

1st speed rpm : 875

Rack travel in m: 10.80...10.90

: 510 2nd speed rpm

Rack travel in m: 13.00...13.20

3rd speed rpm : 700

Rack travel in m: 11.60...11.80 th speed rpm : 550

4th speed

Rack travel in m: 0.00...13.10

Aneroid/Altitude

Compensator Test

1st version

Setting

: 510 Speed rpm hPa : 1200 Pressure

: 13.00...13.20 Rack travel mm

Measurement

1/min: 510 Speed

1st pressure hPa : -

Rack travel in m: 9.10...9.50

2nd pressure hPa : 215

Rack travel in m: 10.30...10.40

3rd pressure hPa : 435

Rack travel in m: 12.20...12.60

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 1200

rpm : 510

Del.quantity cm3/: 240.0...246.0

1000 s: (237.0...249.0)

cm3 : 8.00Spread

1000 s: (12.0)

Aneroid pressure h: 900

Speed rpm : 850
Del.quantity cm3/ : 159.0...161.0 \*

1000 s: (141.5...162.5)

Aneroid pressure h: -

Speed rpm : 400 Del.quantity cm3/: 146.0...150.0 1000 s: (144.0...152.0)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 9.80

Speed rpm : 925...935

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 165.0...205.0

1000 s: (155.0...215.0)

Rack travel in mm : 9.10...9.50

LOW IDLE

Speed rpm : 325 Rack travel in mm : 4.50...4.70 Del.quantity cm3/: 39.0...45.0

1000 s: (37.0...47.0)

cm3 : 8.00 Spread

1000 s: (12.00)

Remarks:

: MACK # 313GC5173P18

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection pump test bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

Setting and blocking of pointer of start-of-delivery sensor on cyl. 1

start of delivery

## Note remarks

Test sheet : MAC 11,1 a4 : 04.09.90 Edition : 02.05.90 Replaces Test oil : ISO-4113

Combination no. : 0 402 746 817

Injection pump

Pump designation : PES6P120A720RS7135 EP type number : 0 412 726 807

Governor

Governor design: : RQV325...900PA848-4K

: 0 421 815 173 Governer no.

Customer-spec, information

: MACK TRUCKS INC. Customer

: EC6 350 4VH Engine

1st version kW : 261.0 : 1800 Rated speed

## TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

assembly : 1 688 901 101

Opening .

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 : (2.70...2.90) Prestroke mm

Rack travel in mm : 9.00...12.00 Firing order : 1-5- 3- 6- 2- 4

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

#### BASIC SETTING

1st speed rpm: 900

Rack travel in mm : 15.20...15.30

Del.quantity cm3/: 25.0...25.2

100 s: (24.7...25.5)

Spread cm3 : 0.5

100 s: (0.9)

rpm : 325.02nd speed Rack travel in mm : 4.9...5.1 Del.quantity cm3/: 3.9...4.5 100 s: (3.7...4.7)

cm3 : 0.8Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm

travel mm : 1.20...1.40

2nd speed 450 rpm

3.10...3.30 travel mm

850 3rd speed rpm

: 5.90...6.10 : 1000 travel mm

4th speed rom

: 7.50...7.70 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 900 Aneroid pressure h: 1200

: 250.5...252.5 :1.quantity 1000 : (247.5...255.5)

: 5.00 cm3 Spread

#### RATED SPEED

1st version Control lever

position degrees: 56...64

Testing:

1st rack travel in: 14.20 rom : 950...960 Speed 2nd rack travel in: 4.00

rpm : 1090...1120 Speed

4th rack travel in: 1200

rpm : 0.00...1.00Speed

LOW IDLE 1 Control lever

position degrees: 7...15

Testing:

Speed : 275 rpm Minimum rack trave: 6.50 Speed rpm

Rack travel in mm : 4.90...5.10

CONSTANT REGULATION

rpm : 325...520 Speed

TORQUE CONTROL

Dimension a mm : ?

Torque control curve - 1st version

1st speed rpm : 900

Rack travel in m: 15.20...15.30

: 625 2nd speed rpm

Rack travel in m: 15.50...15.60

: 700 3rd speed rpm

Rack travel in m: 15.40...15.60

rpm : 500 4th speed

Rack travel in m: 0.00...15.00

Aneroid/Altitude Compensator Test

1st version

Setting

Speed : 625 rom hPa : 1200 Pressure

Rack travel mm : 15.50...15.60

Measurement

1/min: 625 Speed

1st pressure hPa : -

Rack travel in m: 8.60...9.00

2nd pressure hPa : 280

Rack travel in m: 10.70...10.80

3rd pressure hPa : 650

Rack travel in m: 13.60...14.00

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 1200

Speed rpm : 625 Del.quantity cm3/ : 278.0...284.0 1000 s: (275.0...287.0)

cm3 : 8.00 Spread 1000 s: (17.0)

Aneroid pressure h: 1200

Speed rpm : 250 Del.quantity cms/ 550.0...161.0 \* 1000 s: 2247.5...162.5)

Aneroid pressure #1 ~

Speed rpm : 400 Del.quantity cm3/: 730.5...134.5

1000 s: (128.5...136.5)

**BREAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 14.20

rpm : 950...960 Speed

STARTING FUEL DELIVERY

rpm : 100

Del.quantity cm3/: 120.0...160.0 1000 s: (110.0...170.0)

Rack travel in mm : 8.60...9.00

LOW IDLE

Speed rpm

Rack travel in mm : 4.90...5.10

Del.quantity cm3/: 39.0...45.0 1000 s: (37.0...47.0)

Spread

cm3 : 8.00

1000 s: (12.00)

Remarks:

: MACK # 313GC5173-P14

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

#### Note remarks

: MAC 11,1 a5 : 04.09.90 Test sheet Edition Replaces : 02.05.90 Test oil : ISO-4113

Combination no. : 0 402 746 818

Injection pump

Pump designation : PES6P120A720RS7135

: 0 412 726 807 EP type number

Governor

: RQV325...875PA848-5K Governor design.

: 0 421 815 174 Governer no.

Customer-spec. information

: MACK TRUCKS INC. Customer

: EM 6 275L 4VH Engine

1st version kW : 202.0 : 1750 Rated speed

#### TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Opening

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

: 1 680 750 008 Test lines

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 : (2.70...2.90) Prestroke mm

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

# BASIC SETTING

rpm: 875 1st speed

Rack travel in mm : 12.20...12.30

Del.quantity cm3/: 19.0...19.2

100 s: (18.7...19.5)

cm3 : 0.5Spread

100 s: (0.9)

2nd speed rpm : 325.0 Rack travel in mm: 4.6...4.8

Del.quantity cm3/: 3.7...4.3 100 s: (3.5...4.5)

Spread cm3 : 0.8

100 s: (1.2)

# (B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

: 1.20...1.40 travel mm

: 450 2nd speed rom : 2.80...3.10 travel mm

: 850 3rd speed man

: 6.20...6.40 travel mm

1000 4th speed rpm

: 7.70...7.90 travel mm

# FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 875 Speed Aneroid pressure h: 1200

Del.quantity : 190.0...192.0

1000 : (187.0...195.0)

Spread cm3 : 5.00

#### RATED SPEED

1st version Control lever

position degrees: 52...60

Testing:

1st rack travel in: 11.20 rpm : 925...935 Speed 2nd rack travel in: 4.00

rpm : 1030...1060 Speed

4th rack travel in: 1150

rpm : 0.00...1.00 Speed

LOW IDLE 1 Control Lever

position degrees: 9...17

Testing:

Speed rpm : 275 Minimum rack trave: 1.50 rpm : 325 Speed

Rack travel in mm : 4.60...4.80

CONSTANT REGULATION

: 325...520 Speed rom

TORQUE CONTROL

Dimension a mm :?

Torque control curve - 1st version

rpm : 875 1st speed

Rack travel in m: 12.20...12.30

2nd speed rpm : 510

Rack travel in m: 14.10...14.30

rpm : 700 3rd speed

Rack travel in m: 13.20...13.40

rpm : 400 4th speed

Rack travel in m: 0.00...13.80

Aneroid/Altitude Compensator Test

1st version

Setting

: 510 Speed rpm hPa : 1200 Pressure

: 14.10...14.30 Rack travel mm

Measurement

1/min: 510 Speed

1st pressure hPa : -

Rack travel in m: 9.40...9.60

2nd pressure hPa : 280

Rack travel in m: 10.60...10.70

3rd pressure hPa : 485

Rack travel in m: 12.70...13.30

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 1200

: 510 rpm

Del.quantity cm3/: 262.5...268.5 1000 s: (259.5...271.5)

cm3 : 8.00 Spread

1000 s: (12.0)

Aneroid pressure h: 1200

Speed rpm : 850

Del.quantity cm3/: 159.0...161.0 \* 1000 s: (141.5...162.5)

Ameroid pressure h: -

Speed rpm : 400 Del.quantity cm3/ : 145.0...149.0

1000 s: (143.0...151.0)

BREAKAWAY

1st version

1mm rack travel less than

full load rack tr: 11.20

rpm : 925...935 Speed

STARTING FUEL DELIVERY

: 100 Speed rpm

Del.quantity cm3/: 170.0...210.0

1000 s: (160.0...220.0)

Rack travel in mm : 9.40...9.60

LOW IDLE

Speed rpm : 325

Rack travel in mm : 4.60...4.80 Del.quantity cm3/: 37.0...43.0 1000 s: (35.0...45.0)

cm3 : 8.00Spread

1000 s: (12.00)

Remarks:

: MACK # 313GC5173-P22

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection pump test bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Note remarks

Test sheet : MAC 11,1 a6 : 04.09.90 Edition : 02.05.90 Replaces

Test oil : ISO-4113

Combination no. : 0 402 746 819

Injection pump

Pump designation : PES6P120A720RS7135

EP type number : 0 412 726 807

Governor

Governor design. : RQV325...875PA848-6K Governer no. : 0 421 815 175

Customer-spec. information

: MACK TRUCKS Customer

: EM6-225L 4VH Engine

1st version kW : 165.0 : 1750 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

**Opening** 

: 207...210 pressure, bar

Orifice plate

: 0,6 diameter mm

: 1 680 750 008 Test lines

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

Prestroke mm : 2.75...2.85 : (2.70...2.90)
Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 875 1st speed

Rack travel in mm : 11.00...11.10

Del.quantity cm3/: 15.8...16.0

100 s: (15.5...16.3)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.02nd speed Rack travel in mm: 4.6...4.8

Del.quantity cm3/: 3.8...4.4

100 s: (3.6...4.6) cm3 : 0.8

Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

: 1.20...1.40 travel mm

450 2nd speed rpm

2.80...3.20 travel mm

: 850 3rd speed rpm

: 6.20...6.40 travel mm

: 1000 4th speed rpm

: 7.70...7.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 875

Aneroid pressure h: 1200

: 158.5...160.5 Del.quantity

1000 : (155.5...163.5)

cm3 : 5.00 Spread

#### RATED SPEED

1st version Control lever

position degrees: 52...60

Testina:

1st rack travel in: 10.00 rpm : 925...935 Speed 2nd rack travel in: 4.00

rpm : 1015...1045 Speed

4th rack travel in: 1150

rpm : 0.00...1.00Speed

LOW IDLE 1 Control lever

position degrees: 9...17

Testina:

Speed : 275 man. Minimum rack trave: 6.20 : 325 Speed rpm -

Rack travel in mm : 4.60...4.80

CONSTANT REGULATION

: 325...520 Speed rom

TORQUE CONTROL

Dimension a mm :?

Torque control curve - 1st version

rpm : 875 1st speed

Rack travel in m: 11.00...11.10

rpm : 510 2nd speed

3rd speed

Rack travel in m: 13.20...13.40 d speed rpm : 700 Rack travel in m: 11.80...12.00

: 600 4th speed rpm

Rack travel in m: 12.50...12.70

rpm : 350 5th speed

Rack travel in m: 0.00...13.20

Aneroid/Altitude Compensator Test

1st version

Setting

Speed : 510 rom hPa : 1200 Pressure

Rack travel mm : 13.20...13.40

Measurement

1/min: 510 Speed

1st pressure hPa : -

Rack travel in m: 8.50...8.90

2nd pressure hPa : 220

Rack travel in m: 9.70...9.80

3rd pressure hPa : 500

Rack travel in m: 12.00...12.40

## FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 1200 : 510 Speed rom

Del.quantity cm3/: 234.0...240.0 1000 s: (231.0...243.0)

cm3 : 8.00Spread 1000 s: (12.0) Aneroid pressure h: 1200

Speed rpm : 850 Del.quantity cm3/ : 159.0...161.0 \* 1000 s: (141.5...162.5)

Aneroid pressure h: -

Speed rpm : 400 Del.quantity cm3/: 131.0...135.0

1000 s: (129.0...137.0)

## BREAKAWAY

1st version 1mm rack travel less than

full load rack tr: 10.00 rpm : 925...935 Speed

STARTING FUEL DELIVERY

rpm : 100

Del.quantity cm3/: 135.0...175.0 1000 s: (125.0...185.0)

Rack travel in mm : 8.50...8.90

LOW IDLE

rpm : 325 Speed

Rack travel in mm: 4.60...4.80
Del.quantity cm3/: 38.0...44.0
1000 s: (36.0...46.0)
Spread cm3: 8.00

1000 s: (12.00)

Remarks:

: MACK # 313GC5173P26

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

#### Note remarks

Test sheet : MAC 11,1 b5 Edition : 04.05.90 : 2.5.90 Replaces Test oil : ISO-4113

Combination no. : 0 402 746 820

Injection pump

Pump designation : PES6P120A720RS7135

EP type number

: 0 412 726 807 Governor

Governor design. : RQV325...850PA878K Governer no. : 0 421 815 177

Customer-spec. information

: MACK TRUCKS INC. Customer

: E6 275 4VH Engine

: 202.0 1st version kW : 1700 Rated speed

# TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

assembly : 1 688 901 101

**Opening** 

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 Prestroke mm : (2.70...2.90)

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 850 1st speed

Rack travel in mm : 12.00...12.10

Del.quantity cm3/: 18.1...18.3

100 s: (17.8...18.6)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.02nd speed

Rack travel in mm: 4.5...4.7 Del.quantity cm3/: 3.2...3.8

100 s: (3.0...4.0) cm3 : 0.8100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

Spread

1st speed

rpm : 325 : 1.20...1.40 rpm : 450 travel mm

2nd speed

travel mm : 2.80...3.10

rpm : 850 Srd spéed

: 6.20...6.40 travel mm

: 1000 4th speed rpm

: 7.70...7.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 850 Speed

Aneroid pressure h: 900

Aneroid 5. Del.quantity 1000 : 181.O...183.D

: (178.0...186.0)

: 5.00 Spread cm3

RATED SPEED
1st version Control lever position degrees: 5260
Testing: 1st rack travel in: 11.00 Speed rpm: 900910 2nd rack travel in: 4.00 Speed rpm: 10251055 4th rack travel in: 1150 Speed rpm: 0.001.00
LOW IDLE 1 Control lever position degrees: 715
Testing: Speed rpm : 275 Minimum rack trave: 6.10 Speed rpm : 325 Rack travel in mm : 4.504.70
CONSTANT REGULATION Speed rpm : 325520
TORQUE CONTROL Dimension a mm : ? Torque control curve - 1st version 1st speed rpm : 850 Rack travel in m: 12.0012.10 2nd speed rpm : 600 Rack travel in m: 12.6012.70 3rd speed rpm : 700 Rack travel in m: 12.5012.70 4th speed rpm : 500 Rack travel in m: 0.0012.40
Aneroid/Altitude Compensator Test
1st version Setting Speed rpm : 600 Pressure hPa : 900 Rack travel mm : 12.6012.70
Measurement Speed 1/min: 600
1st pressure hPa : - Rack travel in m: 9.509.90 2nd pressure hPa : 215 Rack travel in m: 10.3010.40 3rd pressure hPa : 360 Rack travel in m: 11.5011.90

1st version Aneroid pressure h: 900 : 600 Speed rpm Del.quantity cm3/: 210.5...216.5 1000 s: (207.5...219.5) Spread cm3 : 8.00 1000 s: (12.0) Aneroid pressure h: 900 Speed rpm : 850 Del.quantity cm3/ : 159.0...161.0 \* 1000 s: (141.5...162.5) Aneroid pressure h: -Speed rpm : 400 Del.quantity cm3/: 144.0...148.0 1000 s: (142.0...150.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 11.00 rpm : 900...910 Speed INTERMEDIATE RATED SPEED Rack travel in mm: 11.30 rpm : 805 Speed Rack travel in mm : 4.60 : 300 Speed rom STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 160.0...200.0 1000 s: (150.0...210.0) Rack travel in mm : 9.50...9.90 LOW IDLE Speed rpm Rack travel in mm : 4.50...4.70 Del.quantity cm3/: 32.0...38.0 1000 s: (30.0...40.0) Spread cm3 : 8.001000 s: (12.00)

Remarks:

: MACK # 313GC5173-P4

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

FUEL DELIVERY CHARACTERISTICS

Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Note remarks

: MAC 11,1 b : 04.09.90 Test sheet Edition : 2.5.90 Replaces : ISO-4113 Test oil

Combination no. : 0 402 746 821

Injection pump

Pump designation : PES6P120A720RS7135 : 0 412 726 807 EP type number

Governor

Governor design. : RQV325...850PA878-1K

: 0 421 815 178 Governer no.

Customer-spec. information

: MACK TRUCKS INC. Customer

Engine : E6 300 4VH

1st version kW : 224.0 : 1700 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

**Opening** 

: 207...210 pressure, bar

Orifice plate

: 0,6 diameter mm

: 1 680 750 008 Test lines

Outside diameter

x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 : (2.70...2.90) Prestroke mm

Rack travel in mm : 9.00...12.00 : 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 850

Rack travel in mm : 12.90...13.00

Del.quantity cm3/: 20.0...20.2

100 s: (19.7...20.5)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.0 2nd speed Rack travel in mm : 4.5...4.7 Del.quantity cm3/ : 3.2...3.8

100 s: (3.0...4.0)

cm3 : 0.8 Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

: 1.20...1.40 travel mm

: 450 2nd speed man

2.80...3.10 travel mm

: 850 3rd speed man

: 6.20...6.40 travel mm

: 1000 4th speed rpm

: 7.70...7.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 850

Aneroid pressure h: 900

: 200.5...202.5 Del.quantity

1000 : (197.5...205.5) : 5.00 cm3

Spread : (9.00) 1000

RATED SPEED	†
1st version Control lever position degrees: 5260	1st version Aneroid pressure h: 900 Speed rpm: 700 Del.quantity cm3/: 217.0223.0
Testing: 1st rack travel in: 11.90 Speed rpm : 900910 2nd rack travel in: 4.00 Speed rpm : 10251055 4th rack travel in: 1100 Speed rpm : 0.001.00	1000 s: (214.0226.0)  Aneroid pressure h: 900  Speed rpm : 600  Del.quantity cm3/: 233.0239.0  1000 s: (230.0242.0)  Spread cm3 : 8.00  1000 s: (12.0)  Aneroid pressure h: 900
LOW IDLE 1 Control lever position degrees: 715	Speed rpm: 850
Testing: Speed rpm : 275 Minimum rack trave: 6.10 Speed rpm : 325 Rack travel in mm : 4.504.70	Speed rpm : 400 Del.quantity cm3/ : 154.0158.0 1000 s: (152.0160.0)
CONSTANT REGULATION Speed rpm : 325520	BREAKAWAY  1st version  1mm rack travel less than
TORQUE CONTROL Dimension a mm : ? Torque control curve - 1st version 1st speed rpm : 850 Rack travel in m: 12.9013.00 2nd speed rpm : 700 Rack travel in m: 13.3013.50 3rd speed rpm : 600 Rack travel in m: 13.5013.70 4th speed rpm : 500 Rack travel in m: 0.0013.10	full load rack tr: 11.90 Speed rpm: 900910  INTERMEDIATE RATED SPEED Rack travel in mm: 12.00 Speed rpm: 805 Rack travel in mm: 4.60 Speed rpm: 300.0  STARTING FUEL DELIVERY
Aneroid/Altitude Compensator Test	Speed rpm : 100 Del.quantity cm3/: 195.0235.0 1000 s: (185.0245.0)
1st version Setting Speed rpm : 600 Pressure hPa : 900 Rack travel mm : 13.5013.70	Rack travel in mm: 9.9010.30  LOW IDLE  Speed rpm: 325 Rack travel in mm: 4.504.70
Measurement Speed 1/min: 600	+ Del.quantity cm3/: 32.038.0 + 1000 s: (30.040.0) + Spread cm3 : 8.00
1st pressure hPa : - Rack travel in m: 9.9010.30 2nd pressure hPa : 250 Rack travel in m: 10.9011.00 3rd pressure hPa : 475 Rack travel in m: 12.6013.00	1000 s: (12.00)  Remarks: : MACK # 313GC5173-P8  * This test specification applies only
FUEL DELIVERY CHARACTERISTICS	to the engine/nozzle-and-holder assemblies on an injection-pump test

bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

#### Note remarks

: MAC 11,1 b1 Test sheet Edition : 04.09.90 : 02.05.90 Replaces : ISO-4113 Test oil

: 0 402 746 822 Combination no.

Injection pump

Pump designation : PES6P120A720RS7135

: 0 412 726 807 EP type number

Governor

Governor design. : RQV325...900PA878-2K

: 0 421 815 179 Governer no.

Customer-spec. information

Customer : MACK TRUCKS INC.

: E6 350 4VH Engine

: 261.0 1st version kW : 1800 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

assembly : 1 688 901 101

Opening .

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 Prestroke mm : (2.70...2.90)

Rack travel in mm: 10.50

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 900

Rack travel in mm : 13.90...14.00

Del.guantity cm3/: 23.6...23.8

100 s: (23.3...24.1)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.02nd speed Rack travel in mm: 4.0...4.2 Del.quantity cm3/: 3.2...3.8

100 s: (3.0...4.0)

cm3 : 0.8 Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

: 1.20...1.40 travel mm

: 450 2nd speed rpm

: 3.10...3.30 travel mm

: 850 3rd speed rom

: 5.90...6.10 travel mm

: 1000 4th speed rpm

: 7.50...7.70 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 900 Speed

Aneroid pressure h: 900

Del.quantity

: 236.5...238.5 : (233.5...241.5) 1000

: 5.00 Spread cm3

RATED SPEED
1st version Control lever position degrees: 5563
Testing: 1st rack travel in: 12.90 Speed rpm : 950960 2nd rack travel in: 4.00 Speed rpm : 10751105 4th rack travel in: 1150 Speed rpm : 0.001.00
LOW IDLE 1 Control lever position degrees: 715
Testing: Speed rpm : 275 Minimum rack trave: 5.60 Speed rpm : 325 Rack travel in mm : 4.004.20
CONSTANT REGULATION Speed rpm : 325520
TORQUE CONTROL Dimension a mm : ? Torque control curve - 1st version 1st speed rpm : 900 Rack travel in m: 13.9014.00 2nd speed rpm : 625 Rack travel in m: 14.1014.20 3rd speed rpm : 800 Rack travel in m: 14.0014.10 4th speed rpm : 500 Rack travel in m: 0.0013.50
Aneroid/Altitude Compensator Test
1st version Setting Speed rpm : 625 Pressure hPa : 900 Rack travel mm : 14.1014.20
Measurement Speed 1/min: 625
1st pressure hPa : - Rack travel in m: 8.308.70 2nd pressure hPa : 275 Rack travel in m: 10.0010.10 3rd pressure hPa : 570 Rack travel in m: 12.3012.70

1st version Aneroid pressure h: 900 Speed rpm : 625 Del.quantity cm3/ : 257.0...263.0 1000 s: (254.0...266.0) Spread cm3 : 8.00 1000 s: (12.0) Aneroid pressure h: 900 : 850 Speed rpm Del.quantity cm3/: 159.0...161.0 \* 1000 s: (141.5...162.5) Aneroid pressure h: -Speed rpm : 400 Del.quantity cm3/ : 136.0...140.0 1000 s: (134.0...142.0) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 12.90 rpm : 950...960 Speed INTERMEDIATE RATED SPEED Rack travel in mm : 13.00 rpm : 805 Speed Rack travel in mm: 4.10 Speed rpm STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 140.0...180.0 1000 s: (130.0...190.0) Rack travel in mm : 8.30...8.70 LOW IDLE rpm : 325 Rack travel in mm : 4.00...4.20 Del.quantity cm3/: 32.0...38.0 1000 s: (30.0...40.0) Spread cm3 : 8.001000 s: (12.00) Remarks: : MACK # 313GC5173-P12 \* This test specification applies only

to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

FUEL DELIVERY CHARACTERISTICS

Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Note remarks

: MAC 11,1 b2 : 04.09.90 Test sheet Edition Replaces : 02.05.90 : ISO-4113 Test oil

Combination no. : 0 402 746 823

Injection pump

Pump designation : PES6P120A720RS7135

: 0 412 726 807 EP type number

Governor

Governor design. : RQV325...875PA878-3K

: 0 421 815 180 Governer no.

Customer-spec. information

: MACK TRUCKS INC. Customer

: EM6 275L 4VH Engine

: 202.0 1st version kW : 1750 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Opening

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

: 1 680 750 008 Test lines

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

Prestroke mm : 2.75...2.85 : (2.70...2.90) Rack travel in mm : 9.00...12.00 Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 875

Rack travel in mm : 12.20...12.30

Del.quantity cm3/: 19.0...19.2

100 s: (18.7...19.5)

Spread cm3 : 0.5

100 s: (0.9)

rpm : 325.0 2nd speed Rack travel in mm: 4.6...4.8 Del.quantity cm3/: 3.7...4.3

100 s: (3.5...4.5)

Spread cm3 : 0.8100 s: (1.2)

(B) Setting of injection pump

with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

: 1.20...1.40 travel mm

2nd speed rpm : 450

2.80...3.10 travel mm

850 3rd speed rpm

: 6.20...6.40 travel mm

: 1000 4th speed rpm

: 7.70...7.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 875 Speed Aneroid pressure h: 1200

: 190.0...192.0 Del.quantity 1000 : (187.0...195.0)

: 5.00 cm3 Spread

RATED SPEED 1st version 1st version Control lever Aneroid pressure h: 1200 Speed rpm : 510 Del.quantity cm3/ : 262.5...268.5 position degrees: 52...60 1000 s: (259.5...271.5) Testing: cm3 : 8.001st rack travel in: 11.20 Spread 1000 s: (12.0) rpm : 925...935 Speed 2nd rack travel in: 4.00 Aneroid pressure h: 1200 Speed rpm : 850 Del.quantity cm3/ : 159.0...161.0 \* 1000 s: (141.5...162.5) rpm : 1030...1060 Speed 4th rack travel in: 1150 : 0.00...1.00 Speed rpm Aneroid pressure h: rpm : 400 LOW IDLE 1 Speed Del.quantity cm3/: 145.0...149.0 1000 s: (143.0...151.0) Control lever position degrees: 9...17 Testina: : 275 **BREAKAWAY** Speed rpm Minimum rack trave: 6.20 : 325 1st version Speed rpm Rack travel in mm : 4.60...4.80 1mm rack travel less than CONSTANT REGULATION full load rack tr: 11.20 rpm : 925...935 rpm : 325...520 Speed Speed INTERMEDIATE RATED SPEED TORQUE CONTROL Rack travel in mm: 10.30 Dimension a mm Torque control curve - 1st version Speed rpm : 805.0: 875 Rack travel in mm: 4.70 1st speed rpm Rack travel in m: 12.20...12.30 Speed rom : 510 2nd speed rpm Rack travel in m: 14.10...14.30 STARTING FUEL DELIVERY rpm : 700 3rd speed Rack travel in m: 13.20...13.40 th speed rpm : 400 Speed rpm : 100 Del.quantity cm3/ : 170.0...210.0 1000 s: (160.0...220.0) rpm 4th speed Rack travel in m: 0.00...13.80 Rack travel in mm : 9.40...9.60 Aneroid/Altitude Compensator Test LOW IDLE Speed rpm : 325 Rack travel in mm : 4.60...4.80 1st version Setting Del.quantity cm3/: 37.0...43.0 Speed : 510 rom 1000 s: (35.0...45.0) hPa : 1200 Pressure Rack travel mm : 14.10...14.30 Spread cm3 : 8.001000 s: (12.00) Measurement 1/min: 510 Speed Remarks: : MACK # 313GC5173-P24 1st pressure hPa : -Rack travel in m: 9.40...9.60 \* This test specification applies only 2nd pressure hPa : 280 to the engine/nozzle-and-holder Rack travel in m: 10.60...10.70 3rd pressure hPa : 485 assemblies on an injection-pump test bench: setting for test equipment, Rack travel in m: 12.70...13.30 check value for engine equipment. Delivery-valve spring pre-tension 3.0...3.2 mm.

FUEL DELIVERY CHARACTERISTICS

Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

## Note remarks

: MAC 11,1 b3 Test sheet : 04.09.90 Edition : 02.05.90 Replaces : ISO-4113 Test oil

Combination no. : 0 402 746 824

Injection pump

Pump designation : PES6P120A720RS7135 EP type number : 0 412 726 807

Governor Governor design. : RQV325...875PA878-4K

: 0 421 815 181 Governer no.

Customer-spec. information

Customer : MACK TRUCKS INC.

: EM6 225L 4VH Engine

: 165.0 1st version kW : 1750 Rated speed

## TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Opening

pressure, bar : 207...210

Orifice plate

diameter mm : 0,6

Test Lines : 1 680 750 008

Outside diameter

x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

Prestroke mm : 2.75...2.85 : (2.70...2.90) Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firina order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm : 875

Rack travel in mm : 11.00...11.10

Del.guantity cm3/: 15.8...16.0

100 s: (15.5...16.3)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.02nd speed Rack travel in mm: 4.6...4.8

Del.quantity cm3/: 3.8...4.4 100 s: (3.6...4.6)

Spread cm3 : 0.8100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed

rpm : 325 : 1.20...1.40 travel mm

rpm : 450 2nd speed

: 2.80...3.10 travel mm

: 850 3rd speed rom

: 6.20...6.40 travel mm

: 1000 4th speed rpm

: 7.70...7.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 875

Aneroid pressure h: 900

: 158.5...160.5 Del.quantity 1000 : (155.5...163.5)

: 5.00 cm3 Spread

RATED SPEED	
1st version Control lever position degrees	: 5260
Testing: 1st rack travel in: Speed rpm 2nd rack travel in: Speed rpm 4th rack travel in: Speed rpm	: 925935 : 4.00 : 10151045 : 1150
LOW IDLE 1 Control lever position degrees:	: 917
Testing: Speed rpm: Minimum rack trave: Speed rpm: Rack travel in mm:	: 1,50 : <b>3</b> 25
CONSTANT REGULATION Speed rpm :	325520
TORQUE CONTROL Dimension a mm Torque control curv 1st speed rpm Rack travel in mm 2nd speed rpm Rack travel in mm 3rd speed rpm Rack travel in mm 4th speed rpm Rack travel in mm 5th speed rpm Rack travel in mm 5th speed rpm Rack travel in mm	/e - 1st version : 875 : 11.0011.10 : 510 : 13.2013.40 : 600 : 12.5012.70 : 700 : 11.8012.00 : 350
Aneroid/Altitude Compensator Test	
1st version Setting Speed rpm: Pressure hPa: Rack travel mm:	510 900 13.2013.40
Measurement Speed 1/min:	510
1st pressure hPa : Rack travel in m: 2nd pressure hPa : Rack travel in m: 3rd pressure hPa : Rack travel in m:	8.508.90 220 9.709.80

Rack travel in m: 12.00...12.40

## FUEL DELIVERY CHARACTERISTICS

1st version Aneroid pressure h: 900 Speed rpm : 510

Del.quantity cm3/: 234.0...240.0 1000 s: (231.0...243.0)

Spread cm3 : 8.00 1000 s: (12.0) Aneroid pressure h: 900

Speed rpm : 850 Del.quantity cm3/ : 159.0...161.0 \* 1000 s: (141.5...162.5)

Aneroid pressure h: -

Speed rpm : 400

Del.quantity cm3/: 131.0...135.0 1000 s: (129.0...137.0)

## **BREAKAWAY**

1st version 1mm rack travel less than

full load rack tr: 10.00 Speed rpm : 925...935

INTERMEDIATE RATED SPEED
Rack travel in mm: 10.20
Speed rpm: 805
Rack travel in mm: 4.60
Speed rpm: 300

## STARTING FUEL DELIVERY

# LOW IDLE

Speed rpm : 325 Rack travel in mm : 4.60...4.80 Del.quantity cm3/: 38.0...44.0 1000 s: (36.0...46.0)

Spread cm3 : 8.00 1000 s: (12.00)

## Remarks:

: MACK # 313GC5173-P28

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Note remarks

Test sheet : MAC 11,1 b6 : 04.09.90 Edition : 02.05.90 Replaces

Test oil : ISO-4113

Combination no. : 0 402 746 825

Injection pump

Pump designation : PES6P120A720RS7135

EP type number : 0 412 726 807

Governor

Governor design. : RQV325...900PA878-5K

: 0 421 815 182 Governer no.

Customer-spec, information

: MACK TRUCKS INC. Customer

: E C 6 350 4VH Engine

1st version kW : 261.0 Rated speed : 1800

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

**Opening** 

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test Lines : 1 680 750 008

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 : (2.70...2.90) Prestroke mm

Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 900

Rack travel in mm : 15.00...15.10

Del.guantity cm3/: 25.0...25.2

100 s: (24.7...25.5)

Spread cm3 : 0.5

100 s: (0.9)

rpm : 325.0 2nd speed Rack travel in mm: 4.9...5.1 Del.quantity cm3/: 3.9...4.5 100 s: (3.7...4.7)

cm3 : 0.8 Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed

rpm : 325 : 1.20...1.40 travel mm

rpm : 450 2nd speed

: 3.10...3.30 travel mm

: 850 3rd speed rpm

: 5.90...6.10 travel mm : 1000 4th speed

rom

: 7.50...7.70 travel mm

GUIDE SLEEVE POSITION Control-lever position

Degree: -1

rpm : 1130 Speed

Rack travel in mm : 7.00...13.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 900

2nd pressure hPa : 280 Rack travel in m: 10.40...10.50 Aneroid pressure h: 1200 : 250.5...252.5 Del.quantity 1000 : (247.5...255.5) cm3 : 5.00 3rd pressure hPa : 650 Rack travel in m: 13.30...13.70 Spread 1000 : (9.00) FUEL DELIVERY CHARACTERISTICS RATED SPEED 1st version 1st version Control lever Aneroid pressure h: 1200 position degrees: 56...64 Speed rpm : 625 Del.quantity cm3/: 272.5...278.5 1000 s: (269.5...281.5) Testing: 1st rack travel in: 14.00 cm3 : 8.00Spread rpm : 950...960 1000 s: (12.0) Aneroid pressure h: 1200 2nd rack travel in: 4.00 rpm : 1080...1110 Speed Speed rpm : 850 Del.quantity cm3/: 159.0...161.0 \* 1000 s: (141.5...162.5) 4th rack travel in: 1200 rpm : 0.00...1.00 Speed Aneroid pressure h: rpm : 400 LOW IDLE 1 Speed Del.quantity cm3/: 130.5...134.5 Control Lever 1000 s: (128.5...136.5) position degrees: 7...15 Testing: : 275 **BREAKAWAY** Speed man Minimum rack trave: 6.60 rpm : 325 1st version Rack travel in mm : 4.90...5.10 1mm rack travel less than full load rack tr: 14.00 CONSTANT REGULATION rpm : 325...520 rpm : 950...960 Speed Speed INTERMEDIATE RATED SPEED TORQUE CONTROL Rack travel in mm: 13.70 Dimension a mm :? Torque control curve - 1st version rpm : 850 Speed Rack travel in mm : 5.00 Speed rpm : 350 1st speed rpm : 900 Rack travel in m: 15.00...15.10 rpm : 625 2nd speed Rack travel in m: 15.40...15.50 STARTING FUEL DELIVERY 3rd speed rpm : 700 Rack travel in m: 15.30...15.40 4th speed rpm : 500 rpm : 100 Speed Del.quantity cm3/: 130.0...170.0 1000 s: (120.0...180.0) Rack travel in m: 0.00...15.00 Rack travel in mm : 8.30...8.70 Aneroid/Altitude Compensator Test LOW IDLE Speed rpm : 325
Rack travel in mm : 4.90...5.10
Del.quantity cm3/ : 39.0...45.0
1000 s: (37.0...47.0) 1st version Setting : 625 Speed rpm hPa : 1200 Pressure cm3 : 8.00 Rack travel mm : 15.40...15.50 Spread 1000 s: (12.00) Measurement 1/min: 625 Remarks: Speed : MACK # 313GC5173-P16 1st pressure hPa : -Rack travel in m: 8.30...8.70 Delivery-valve spring pre-tension

# 3.0...3.2 mm.

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

#### Note remarks

: MAC 11,1 b4 : 04.09.90 Test sheet Edition : 02.05.90 Replaces : ISO-4113 Test oil

Combination no. : 0 402 746 826

Injection pump

Pump designation : PES6P120A720RS7135 : 0 412 726 807 EP type number

Governor

Governor design. : RQV325...875PA878-6K

: D 421 815 183 Governer no.

Customer-spec. information

Customer : MACK TRUCKS INC.

: EM6 250L 4VH Engine

1st version kW : 186.0 : 1750 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Openina

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 Prestroke mm : (2.70...2.90)

Rack travel in mm : 9.00...12.00

Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 875 1st speed

Rack travel in mm : 10.80...10.90

Del.quantity cm3/: 16.3...16.5

100 s: (16.0...16.8)

Spread cm3 : 0.5

100 s: (0.9)

rpm : 325.0 2nd speed Rack travel in mm: 4.5...4.7 Del.quantity cm3/: 3.9...4.5 100 s: (3.7...4.7)

cm3 : 0.8Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

: 1.20...1.40 travel mm

450 2nd speed rpm

2.80...3.20 travel mm

3rd speed : 850 rpm

: 6.20...6.40 travel mm

: 1000 4th speed rpm

travel mm : 7.70...7.90

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 875 Speed

Aneroid pressure h: 1200

: 163.0...165.0 Del.quantity 1000 : (160.0...168.0)

: 5.00 Spread cm3

: (9.00) 1000

RATED SPEED 1st version 1st version Control Lever Aneroid pressure h: 1200 position degrees: 52...60 : 510 rpm Del.quantity cm3/: 240.0...246.0 1000 s: (237.0...249.0) Testina: cm3 : 8.00 1st rack travel in: 9.80 Spread rpm : 925...935 1000 s: (12.0) Speed 2nd rack travel in: 4.00 Aneroid pressure h: 1200 : 1010...1040 : 850 Speed rpm Speed rpm Del.quantity cm3/: 159.0...161.0 \* 1000 s: (141.5...162.5) 4th rack travel in: 1100 rpm : 0.00...1.00Speed Aneroid pressure h: -Speed rpm : 400 Del.quantity cm3/: 146.0...150.0 LOW IDLE 1 Control lever 1000 s: (144.0...152.0) position degrees: 9...17 Testina: **BREAKAWAY** Speed : 275 rpm Minimum rack trave: 6.10 1st version Speed rpm Rack travel in mm : 4.50...4.70 1mm rack travel less than CONSTANT REGULATION full load rack tr: 9.80 rpm : 325...520 rpm : 925...935 Speed Speed TORQUE CONTROL INTERMEDIATE RATED SPEED Rack travel in mm: 10.20 Dimension a mm Torque control curve - 1st version Speed 1st speed rpm : 875 Rack travel in mm: 4.60 Rack travel in m: 10.80...10.90 Speed rpm : 300 nd speed rpm : 510 Rack travel in m: 13.00...13.20 2nd speed rpm STARTING FUEL DELIVERY : 700 3rd speed rpm Rack travel in m: 11.60...11.80 4th speed rpm : 550 rpm : 100 Speed Rack travel in m: 0.00...13.10 Del.quantity cm3/: 145.0...185.0 1000 s: (135.0...195.0) Rack travel in mm : 8.60...9.00 Aneroid/Altitude Compensator Test LOW IDLE 1st version rpm : 325 Speed Rack travel in mm : 4.50...4.70 Setting Del.quantity cm3/: 39.0...45.0 1000 s: (37.0...47.0) Speed : 510 rom hPa : 1200 Pressure cm3 : 8.00 : 13.00...13.20 Rack travel mm Spread 1000 s: (12.00) Measurement 1/min: 510 Remarks: Speed : MACK # 313GC5173-P20 1st pressure hPa : -Rack travel in m: 8.60...9.00 2nd pressure hPa : 215 Delivery-valve spring pre-tension 3.0...3.2 mm. Rack travel in m: 10.30...10.40 3rd pressure hPa : 435 \* This test specification applies only to the engine/nozzle-and-holder Rack travel in m: 12.20...12.60

assemblies on an injection-pump test

bench: setting for test equipment,

FUEL DELIVERY CHARACTERISTICS

check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Note remarks

Test sheet : MAC 11,1 d Edition : 04.09.90 Replaces : 02.05.90 Test oil : ISO-4113

Combination no. : 0 402 746 828

Injection pump

Pump designation : PES6P120A720RS7148

EP type number : 0 412 726 810

Governor

Governor design. : RQV325...875PA878-7K

: 0 421 815 184 Governer no.

Customer-spec. information

: MACK TRUCKS INC. Customer

: EM6 300L 4VH Engine

: 224.0 1st version kW : 1750 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

assembly : 1 688 901 101

Opening (

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter

x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

Prestroke mm

: 2.75...2.85 : (2.70...2.90)

Rack travel in mm : 6.00...8.00

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

: 0.50 (0.75) Tolerance + - °

Time to cyl. no. : 1

BASIC SETTING

rpm: 875 1st speed

Rack travel in mm : 11.10...11.20

Del.quantity cm3/: 19.9...20.1

100 s: (19.6...20.4)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.02nd speed Rack travel in mm: 4.5...4.7 Del.quantity cm3/ : 3.9...4.5

100 s: (3.7...4.7)

cm3 : 0.8 Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm

travel mm : 1.20...1.40

2nd speed rpm 450

2.50...2.80 travel mm

3rd speed 600 rom

4.10...4.30 travel mm : 875 4th speed

rpm : 7.30...7.50 travel mm

: 1000 5th speed rom

: 8.70...9.00 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 875

Aneroid pressure h: 1500

Del.quantity : 199.0...201.0

1000 : (196.0...204.0)

cm3 : 5.00Rack travel in m: 10.70...10.80 Spread 3rd pressure hPa : 710 1000 : (9.00) Rack travel in m: 14.40...14.80 RATED SPEED FUEL DELIVERY CHARACTERISTICS 1st version Control Lever position degrees: 55...63 1st version Aneroid pressure h: 1500 Speed rpm : 510
Del.quantity cm3/: 299.0...305.0
1000 s: (296.0...308.0) Testing: 1st rack travel in: 10.10 rpm : 915...925 Speed 2nd rack travel in: 4.00 : 8.00 Spread cm3 rpm : 1000...1030 1000 s: (12.0) Speed 4th rack travel in: 1150 Aneroid pressure h: 1500 rpm : 0.00...1.00: 875 Speed Speed rom Del.quantity cm3/: 199.0...201.0 1000 s: (168.0...193.0) LOW IDLE 1 Control Lever Aneroid pressure h: rpm : 400 position degrees: 7...15 Speed Del.quantity cm3/: 152.5...156.5 1000 s: (150.5...158.5) Testing: rpm : 275 Speed Minimum rack trave: 6.10 BREAKAWAY rpm Rack travel in mm : 4.50...4.70 1st version CONSTANT REGULATION 1mm rack travel less than rpm : 325...520 Speed full load rack tr: 10.10 TORQUE CONTROL Speed rpm : 915...925 Dimension a mm Torque control curve - 1st version INTERMEDIATE RATED SPEED Rack travel in mm: 11.30 1st speed rom : 875 Rack travel in m: 11.10...11.20 Speed rpm : 805 : 510 2nd speed Rack travel in mm: 4.60 rpm Rack travel in m: 16.50...16.70 d speed rpm : 700 Rack travel in m: 13.30...13.50 Speed rom : 300 3rd speed STARTING FUEL DELIVERY rpm : 600 4th speed Rack travel in m: 15.50...15.70 rpm : 450 rpm : 100 5th speed Del.quantity cm3/: 140.0...160.0 1000 s: (135.0...165.0) Rack travel in m: 0.00...16.60 Rack travel in mm : 8.30...8.70 Aneroid/Altitude Compensator Test LOW IDLE rpm : 325 1st version Speed Rack travel in mm : 4.50...4.70 Setting Del.quantity cm3/: 39.0...45.0 1000 s: (37.0...47.0) Speed : 510 rom hPa : 1500 Pressure : 16.50...16.70 cm3 : 8.00 Rack travel mm Spread 1000 s: (12.00) Measurement 1/min: 510 Speed Remarks: : MACK # 313GC5174-P4 Delivery-valve spring pre-tension 3.0...3.2 mm. 1st pressure hPa : -Rack travel in m: 8.30...8.70 2nd pressure hPa : 370

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Setting and blocking of painter of start-of-delivery sensor on cyl. 1 start of delivery

Note remarks

Test sheet : MAC 11,1 a7 : 04.09.90 Edition

Replaces : 02.05.90 Test oil : ISO-4113

: 0 402 746 829 Combination no.

Injection pump

Pump designation : PES6P120A720RS7135

: 0 412 726 807 EP type number

Governor

: RQV325...1050PA848-8 Governor design.

: 0 421 815 185 Governer no.

Customer—spec. information

: MACK TRUCKS Customer

: E6-270 4VH Engine

: 201.0 1st version kW : 2100 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Opening

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

Prestroke mm

: 2.75...2.85 : (2.70...2.90)

Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 1050 1st speed

Rack travel in mm : 12.20...12.30

Del.quantity cm3/: 17.4...17.6

100 s: (17.1...17.9)

Spread cm3 : 0.5

100 s: (0.9)

2nd speed rpm : 325.0 Rack travel in mm: 4.9...5.1

Del.quantity cm3/: 3.8...4.4 100 s: (3.6...4.6)

cm3 : 0.8Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

: 1.40...1.60 travel mm : 450

2nd speed rpm

: 2.50...2.80 travel mm

: 800 3rd speed rpm

travel mm : 4.80...5.00

1050 4th speed rpm

: 7.30...7.60 : 1200 travel mm

5th speed rpm

: 9.40...9.60 travel mm

GUIDE SLEEVE POSITION

Control-lever position

Degree: -1 rpm : 1210

Rack travel in mm : 7.00...13.00

FULL LOAD DELIV. AT FULL LOAD STOP

1st version 1st pressure hPa : -Rack travel in m: 8.60...9.00 Speed rpm : 1050 2nd pressure hPa : 270 Aneroid pressure h: 900 : 174.0...176.0 Rack travel in m: 9.60...9.70 Del.quantity 1000 : (171.3...179.0) 3rd pressure hPa : 400 Rack travel in m: 11.00...11.50 : 5.00 cm3 Spread 1000 : (9.00) FUEL DELIVERY CHARACTERISTICS RATED SPEED 1st version 1st version Aneroid pressure h: 900 Control lever position degrees: 55...63 : 630 Speed rpm Del.quantity cm3/: 192.0...198.0 1000 s: (189.0...201.0) Testing: Spread cm3 : 8.00 1st rack travel in: 11.20 1000 s: (12.0) rpm : 1090...1100 Speed Aneroid pressure h: 900 2nd rack travel in: 4.00 rpm : 1170...1200 Speed Speed rpm 4th rack travel in: 1300 Speed rpm : 0.00...1.00 Del.quantity cm3/: 159.0...161.0 1000 s: (140.5...161.5) Aneroid pressure h: rpm : 400 LOW IDLE 1 Speed Del.quantity cm3/: 129.0...133.0 1000 s: (127.0...135.0) Control lever position degrees: 10...18 Testing: Speed **BREAKAWAY** rpm : 275 Minimum rack trave: 6.40 : 325 1st version rpm Rack travel in mm : 4.90...5.10 1mm rack travel less than full load rack tr: 11.20 CONSTANT REGULATION rpm : 1090...1100 rpm : 325...600 Speed Speed STARTING FUEL DELIVERY TORQUE CONTROL Dimension a mm Torque control curve - 1st version Speed rpm : 100
Del.quantity cm3/ : 135.0...175.0
1000 s: (125.0...185.0) 1st speed rpm : 1050 Rack travel in m: 12.20...12.30 : 630 2nd speed rpm Rack travel in m: 12.00...12.20 Rack travel in mm : 8.60...9.00 3rd speed rpm : 925 Rack travel in m: 11.90...12.10 LOW IDLE 4th speed rpm : 800 Speed rpm : 325 Rack travel in mm : 4.90...5.10 Rack travel in m: 12.20...12.40 Aneroid/Altitude Del.quantity cm3/: 38.0...44.0 1000 s: (36.0...46.0) Compensator Test cm3 : 8.00 Spread 1000 s: (12.00) 1st version Setting Remarks: : MACK # 313GC5173P30 Speed : 630 rpm Pressure hPa : 900 : 12.00...12.10 Delivery-valve spring pre-tension Rack travel mm 3.0...3.2 mm. Measurement 1/min: 630 \* This test specification applies only Speed

N03

to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Note remarks

Test sheet : MAC 12,0 a
Edition : 04.09.90
Replaces : 02.05.90
Test oil : ISO-4113

Combination no. : 0 402 746 836

Injection pump

Pump designation : PES6P120A720RS7157

EP type number : 0 412 726 814

Governor

Governor design. : RQV325...900PA848-12

K

Governer no. : 0 421 815 192

Customer-spec. information

Customer : MACK TRUCKS INC.

Engine : E7 400 4VH

1st version kW : 298.0 Rated speed : 1800

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

assembly : 1 688 901 101

Opening

pressure, bar : 207...210

Orifice plate

diameter mm : 0.6

Test lines : 1 680 750 008

Outside diameter x Wall thickness

x Length mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

Prestroke mm : 2.75...2.85

: (2.70...2.90)

Rack travel in mm : 9.00...12.00 Firing order : 1-5-3-6-2-4

Phasing : 0-60-120-180-240-300

Phasing

Tolerance  $+ - \circ : 0.50 (0.75)$ 

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 900

Rack travel in mm : 15.50...15.60

Del.quantity cm3/: 27.2...27.4

100 s: (26.9...27.7)

Spread cm3 : 0.5

100 s: (0.9)

2nd speed rpm : 325.0

Rack travel in mm : 4.9...5.1 Del.quantity cm3/ : 4.3...4.9

100 s: (4.1...5.1)

Spread cm3 : 0.8

100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 325

travel mm : 1.30...1.60 2nd speed rpm : 500

travel mm : 3.40...4.00 3rd speed rpm : 900

travel mm : 6.70...6.90

4th speed rpm: 1075

travel mm : 8.40...8.90

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm: 900 Aneroid pressure h: 1200

Del.quantity : 272.0...274.0

1000 : (269.0...277.0)

cm3 : 5.00

1000 : (9.00)

RATED SPEED

Spread

1st version Control Lever position degrees: 56...64 Testina: 1st rack travel in: 14.50 rpm : 940...950 Speed 2nd rack travel in: 4.00 : 1115...1145 Speed rom 4th rack travel in: 1250 rpm : 0.00...1.00Speed LOW IDLE 1 Control lever position degrees: 10...18 Testing: Speed : 275 mon Minimum rack trave: 1.50 rpm : 325 Rack travel in mm : 4.90...5.10 CONSTANT REGULATION rpm : 325...500 Speed TORQUE CONTROL Dimension a mm Torque control curve - 1st version 1st speed rpm : 900 Rack travel in m: 15.50...15.60 : 625 2nd speed rom Rack travel in m: 15.30...15.50 : 500 3rd speed rpm Rack travel in m: 0.00...14.60 Aneroid/Altitude Compensator Test 1st version Setting : 900 Speed man hPa : 1200 Pressure Rack travel mm : 15.50...15.60 Measurement 1/min: 900 Speed 1st pressure hPa : -Rack travel in m: 8.20...8.60 2nd pressure hPa : 225 Rack travel in m: 9.40...9.50 3rd pressure hPa : 770 Rack travel in m: 13.80...14.20 START CUT-OUT

1/min: 280 (290)

FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 1200 Speed rpm : 625 Del.quantity cm3/: 309.0...315.0 1000 s: (306.0...318.0) cm3 : 8.00Spread 1000 s: (12.0) Aneroid pressure h: 1200 : 850 Speed rom Del.quantity cm3/: 159.0...161.0) 1000 s: (136.5...157.0) Aneroid pressure h: -: 400 Speed rpm Del.quantity cm3/: 166.0...170.0 1000 s: (164.0...172.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 14.50 rpm : 940...950 Speed STARTING FUEL DELIVERY rpm : 100 Speed Del.quantity cm3/: 170.0...210.0 1000 s: (160.0...220.0) Rack travel in mm : 9.90...10.30 LOW IDLE

Speed rpm: 325
Rack travel in mm: 4.90...5.10
Del.quantity cm3/: 43.0...49.0
1000 s: (41.0...51.0)
Spread cm3: 8.00
1000 s: (12.00)

Remarks:

: MACK # 313GC5179-P18

Delivery-valve spring pre-tension 3.0...3.2 mm.

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Speed

#### Note remarks

: MAC 12,0 a1 Test sheet : 04.09.90 Edition : 02.05.90 Replaces : ISO-4113 Test oil

Combination no. : 0 402 746 837

Injection pump

Pump designation : PES6P120A720RS7157 EP type number : 0 412 726 814

Governor

Governor design. : RQV325...900PA848-15

: 0 421 815 193 Governer no.

Customer-spec. information

Customer : MACK TRUCKS INC.

: E7 350 4VH Engine

1st version kW : 261.0 Rated speed : 1800

## TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Openina

: 207...210 pressure, bar

Orifice plate

: 0,6 diameter mm

Test Lines : 1 680 750 008

Outside diameter x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 : (2.70...2.90) Prestroke mm

Rack travel in mm : 9.00...12.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 900 1st speed

Rack travel in mm : 14.00...14.10

Del.quantity cm3/: 22.8...23.0

100 s: (22.5...23.3)

Spread cm3 : 0.5

100 s: (0.9)

2nd speed rpm : 325.0 Rack travel in mm : 5.3...5.5

Del.quantity cm3/: 4.1...4.7

100 s: (3.9...4.9)

cm3 : 0.8Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed

rpm : 325 : 1.30...1.60 travel mm 500 2nd speed rpm :

travel mm : 3.40...4.00

: 900 3rd speed rpm

: 6.70...6.90 travel mm rpm : 1075 4th speed

: 8.40...8.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 900 Speed Aneroid pressure h: 900

228.0...230.0 Del.quantity

1000 : (225.0...233.0)

Spread cm3 : 5.00

: (9.00) 1000

RATED SPEED

1st version Control lever position degrees: 56...64 Testing: 1st rack travel in: 13.00 rpm : 950...960 Speed 2nd rack travel in: 4.00 rpm : 1100...1130 Speed 4th rack travel in: 1250 rpm : 0.00...1.00Speed LOW IDLE 1 Control Lever position degrees: 10...18 Testing: Speed rom Minimum rack trave: 6.90 : 325 Speed man Rack travel in mm : 5.30...5.50 CONSTANT REGULATION : 325...500 Speed rom TORQUE CONTROL Dimension a mm Torque control curve - 1st version 1st speed rpm : 900 Rack travel in m: 14.00...14.10 : 625 2nd speed rpm Rack travel in m: 13.80...14.00 : 500 3rd speed rpm Rack travel in m: 0.00...13.20 Aneroid/Altitude Compensator Test 1st version Setting : 900 Speed rpm hPa : 900 Pressure : 14.00...14.10 Rack travel mm Measurement 1/min: 900 Speed 1st pressure hPa : -Rack travel in m: 8.80...9.20 2nd pressure hPa : 225 Rack travel in m: 10.20...10.30 3rd pressure hPa : 545 Rack travel in m: 12.70...13.10 START CUT-OUT

1/min: 265 (275)

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 900 : 625 Speed rpm

Del.quantity cm3/: 260.0...266.0 1000 s: (257.0...269.0)

cm3 : 8.00 Spread 1000 s: (12.0)

Aneroid pressure h: 900 Speed rpm

Del.quantity cm3/: 159.0...161.0 \* 1000 s: (136.5...157.0)

Aneroid pressure h: -Speed rpm : 400

Del.quantity cm3/: 166.0...170.0 1000 s: (164.0...172.0)

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 13.00 rpm : 950...960 Speed

STARTING FUEL DELIVERY

: 100 Speed rpm

Del.quantity cm3/: 170.0...210.0

1000 s: (160.0...220.0)

Rack travel in mm : 10.40...10.80

LOW IDLE

Speed rpm : 325 Rack travel in mm : 5.30...5.50 Del.quantity cm3/: 41.0...47.0

1000 s: (39.0...49.0)

Spread cm3 : 8.00

1000 s: (12.00)

Remarks:

: MACK # 313GC5179-P2

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Speed

Note remarks

: MAC 12,0 a7 Test sheet : 04.09.90 Edition : 02.05.90 Replaces : ISO-4113 Test oil

Combination no. : 0 402 746 838

Injection pump

Pump designation : PES6P120A720RS7157 : 0 412 726 814 EP type number

Governor

Governor design. : RQV325...875PA848-14

: 0 421 815 194 Governer no.

Customer—spec. information Customer : MACK

Engine : EM7-250L 4VH

1st version kW : 187.0 Rated speed : 1750

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Opening

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

: 1 680 750 008 Test lines

Outside diameter

x Wall thickness

: 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 Prestroke mm

: (2.70...2.90)

Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 875 1st speed

Rack travel in mm : 10.40...10.50

Del.quantity cm3/: 17.4...17.6

100 s: (17.1...17.9)

Spread cm3 : 0.5

100 s: (0.9)

rpm : 325.0 2nd speed Rack travel in mm: 4.7...4.9 Del.quantity cm3/: 4.0...4.6

100 s: (3.8...4.8)

cm3 : 0.8Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 325

: 1.30...1.60 travel mm

2nd speed : 500 rpm

: 3.40...4.00 travel mm

: 900 3rd speed rpm

: 6.70...6.90 travel mm

: 1075 4th speed rpm

: 8.40...8.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 875 Speed

Aneroid pressure h: 900

: 174.0...176.0 Del.quantity 1000 : (171.0...179.0)

: 5.00 Spread cm3

: (9.00) 1000

RATED SPEED

1st version Control lever position degrees: 54...62 Testina: 1st rack travel in: 9.40 rpm : 915...925 Speed 2nd rack travel in: 4.00 : 1020...1050 Speed rom 4th rack travel in: 1200 rpm : 0.00...1.00 Speed LOW IDLE 1 Control lever position degrees: 12...20 Testing: Speed : 275 rpm Minimum rack trave: 6.30 rpm : 325 Rack travel in mm : 4.70...4.90 CONSTANT REGULATION rpm : 325...520 Speed TORQUE CONTROL Dimension a mm : ? Torque control curve - 1st version 1st speed rpm : 875 Rack travel in m: 10.40...10.50 2nd speed rpm : 510 Rack travel in m: 11.90...12.10 3rd speed rpm : 450 Rack travel in m: 0.00...11.80 Aneroid/Altitude Compensator Test 1st version Setting : 510 Speed rpm hPa : 900 Pressure : 11.90...12.10 Rack travel mm Measurement 1/min: 510 Speed 1st pressure hPa : -Rack travel in m: 7.80...8.20 2nd pressure hPa : 235 Rack travel in m: 8.80...8.90 3rd pressure hPa : 485 Rack travel in m: 10.80...11.20

1st version
Aneroid pressure h: 900
Speed rpm : 510

Del.quantity cm3/: 244.0...250.0 1000 s: (241.0...253.0) Spread cm3 : 8.00 1000 s: (12.0) Aneroid pressure h: 900 Speed rpm : 850

Del.quantity cm3/: 159.0...161.0 \* 1000 s: (136.5...157.0)

Speed rpm : 400

Del.quantity cm3/: 151.0...155.0 1000 s: (149.0...157.0)

# **BREAKAWAY**

1st version 1mm rack travel less than

full load rack tr: 9.40 Speed rpm : 915...925

STARTING FUEL DELIVERY

Speed rpm: 100

Del.quantity cm3/: 170.0...210.0 1000 s: (160.0...220.0)

Rack travel in mm : 10.10...10.30

LOW IDLE

Speed rpm : 325
Rack travel in mm : 4.70...4.90
Del.quantity cm3/: 40.0...46.0
1000 s: (38.0...48.0)
Spread cm3 : 8.00
1000 s: (12.00)

Remarks:

: MACK # 313GC5179-P26

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Bow dimension: Sliding-sleeve position = 37.0 mm Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Speed

START CUT-OUT

1/min : 275 (285)

#### Note remarks

: MAC 12.0 b : 04.09.90 : 02.05.90 Test sheet Edition Replaces : ISO-4113 Test oil

Combination no. : 0 402 746 839

Injection pump

Pump designation : PES6P120A720RS7148 : 0 412 726 810

EP type number

Governor

: RQV325...875PA848-19 Governor design.

: 0 421 815 199 Governer no.

Customer-spec. information : MACK Customer

: EM7 300L 4VH Engine

: 224.0 : 1750 1st version kW Rated speed

## TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Opening

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

: 1 680 750 008 Test lines

Outside diameter x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 : (2.70...2.90) Prestroke mm

Rack travel in mm : 6.00...8.00

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 875 1st speed

Rack travel in mm : 11.50...11.60

Del.quantity cm3/: 21.0...21.2

100 s: (20.7...21.5)

cm3 : 0.5Spread

100 s: (0.9)

2nd speed rpm : 325.0 Rack travel in mm : 4.5...4.7 Del.quantity cm3/ : 4.1...4.7

100 s: (3.9...4.9)

cm3 : 0.8Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed rpm : 325 1.20...1.40 travel mm

: 450 2nd speed man

2.50...2.80 travel mm 3rd speed rpm : 600

: 4.10...4.30 travel mm

: 875 4th speed rpm : 7.30...7.50 travel mm

1000 5th speed rpm

8.70...9.00 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

rpm : 875 Speed

Aneroid pressure h: 1200 Del. quantity : 210.0...212.0

1000 : (207.0...215.0)

cm3 : 5.00 1000 : (9.00) Spread RATED SPEED 1st version Control lever position degrees: 57...65 Testing: 1st rack travel in: 10.50 Speed rpm: 915...925
2nd rack travel in: 4.00
Speed rpm: 1000...1030
4th rack travel in: 1150 Speed rpm : 0.00...1.00LOW IDLE 1 Control Lever position degrees: 8...16 Testing: Speed rom. : 275 Minimum rack trave: 6.10 : 325 rom Rack travel in mm : 4.50...4.70 CONSTANT REGULATION rpm : 325...520 Speed TORQUE CONTROL Dimension a mm Torque control curve - 1st version 1st speed rpm : 875 Rack travel in m: 11.50...11.60 nd speed rpm : 510 Rack travel in m: 16.00...16.20 2nd speed rpm : 800 3rd speed Rack travel in m: 12.00...12.20 4th speed rpm : 600 Rack travel in m: 15.10...15.30 : 450 5th speed rpm Rack travel in m: 0.00...15.70 Aneroid/Altitude Compensator Test 1st version Setting : 510 Speed rpm hPa : 1200 Pressure : 16.00...16.20 Rack travel mm Measurement 1/min: 510 Speed

Rack travel in m: 10.60...10.70 3rd pressure hPa : 815 Rack travel in m: 14.30...14.70 FUEL DELIVERY CHARACTERISTICS 1st version Aneroid pressure h: 1200 : 510 rpm Del.quantity cm3/: 294.0...300.0 1000 s: (291.0...303.0) cm3 : 8.00Spread 1000 s: (12.0) Aneroid pressure h: 1200 Speed Speed rpm : 875 Del.quantity cm3/ : 199.0...201.0 \* 1000 s: (166.0...191.0) rpm Aneroid pressure h: rpm : 400 Speed Del.quantity cm3/: 166.0...170.0 1000 s: (164.0...172.0) BREAKAWAY 1st version 1mm rack travel less than full load rack tr: 10.50 rpm : 915...925 Speed STARTING FUEL DELIVERY : 100 Speed rom Del.quantity cm3/: 165.0...185.0 1000 s: (155.0...195.0) Rack travel in mm : 8.70...9.10 LOW IDLE Speed rpm : 325 Rack travel in mm : 4.50...4.70 Del.quantity cm3/: 41.0...47.0 1000 s: (39.0...49.0) cm3 : 8.00 Spread 1000 s: (12.00) Remarks: : MACK # 313GC5179-P6 Delivery-valve spring pre-tension 3.0...3.2 mm. \* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test

bench: setting for test equipment, check value for engine equipment.

1st pressure hPa : -

2nd pressure hPa : 325

Rack travel in m: 8.70...9.10

Note remarks

: MAC 11,1a12 Test sheet : 04.09.90 Edition : 02.05.90 Replaces Test oil : ISO-4113

: 0 402 746 840 Combination no.

Injection pump

Pump designation : PES6P120A720RS7135

EP type number

: 0 412 726 807

Governor

: RQV325...875PA848-18 Governor design.

: 0 421 815 198 Governer no.

Customer-spec. information : MACK Customer

Engine : EMC6 250L 4VH

1st version kW : 187.0 : 1750 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

**Opening** 

: 207...210 pressure, bar

Orifice plate

diameter mm : 0.6

Test lines : 1 680 750 008

Outside diameter x Wall thickness

x Length mm : 6.00x2.00x600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

Prestroke mm

: 2.75...2.85 : (2.70...2.90)

Rack travel in mm : 9.00...12.00

Firing order

: 1-5-3-6-2-4

: 0-60-120-180-240-300 Phasing

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

1st speed rpm: 875

Rack travel in mm : 11.20...11.30

Del.quantity cm3/: 17.3...17.5

100 s: (17.0...17.8)

Spread cm3 : 0.5

100 s: (0.9)

2nd speed rpm : 325.0 Rack travel in mm : 4.5...4.7 Del.quantity cm3/: 3.9...4.5

100 s: (3.7...4.7)

cm3 : 0.8 Spread 100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

: 1.20...1.40 travel mm

rpm : 450 2nd speed : 2.80...3.20 travel mm

rpm : 850 3rd speed

: 6.20...6.40 travel mm

rpm : 1000 4th speed : 7.70...7.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 875 Aneroid pressure h: 1200

: 173.0...175.0 Del.quantity

1000 : (170.0...178.0)

: 5.00 Spread cm3

: (9.00) 1000

## RATED SPEED 1st version Control Lever position degrees: 54...52 Testing: 1st rack travel in: 10.20 rpm : 915...925 Speed 2nd rack travel in: 4.00 : 1010...1040 Speed man 4th rack travel in: 1100 rpm : 0.00...1.00Speed LOW IDLE 1 Control Lever position degrees: 9...17 Testina: : 275 Speed rpm Minimum rack trave: 1.50 Speed : 325 rom Rack travel in mm : 4.50...4.70 CONSTANT REGULATION : 325...520 Speed man TORQUE CONTROL Dimension a mm : ? Torque control curve - 1st version rpm : 875 1st speed Rack travel in m: 11.20...11.30 : 510 2nd speed rom Rack travel in m: 13.10...13.30 rpm : 700 3rd speed Rack travel in m: 12.00...12.20 : 450 4th speed rom Rack travel in m: 0.00...13.10 Aneroid/Altitude Compensator Test 1st version Setting : 510 Speed rom hPa : 1200 Pressure : 13.10...13.30 Rack travel mm Measurement 1/min: 510 Speed 1st pressure hPa : -Rack travel in m: 9.10...9.50 2nd pressure hPa : 215 Rack travel in m: 10.30...10.40

1st version Aneroid pressure h: 1200 Speed rpm : 510 Del.quantity cm3/: 239.0...245.0 1000 s: (236.0...248.0) cm3 : 8.00 Spread 1000 s: (12.0) Aneroid pressure h: 1200 Speed rpm Del.quantity cm3/: 159.0...161.0 \* 1000 s: (141.5...162.5) Aneroid pressure h: -Speed rpm Del.quantity cm3/: 146.0...150.0 1000 s: (144.0...152.0) **BREAKAWAY** 1st version 1mm rack travel less than full load rack tr: 10.20 rpm : 915...925 Speed STARTING FUEL DELIVERY : 100 Speed rpm Del.quantity cm3/: 160.0...200.0 1000 s: (150.0...210.0) Rack travel in mm: 9.10...9.50 LOW IDLE Speed rpm Rack travel in mm : 4.50...4.70 Del.quantity cm3/: 39.0...45.0 1000 s: (37.0...47.0) cm3 : 8.00 1000 s: (12.00) Spread Remarks: : MACK # 313GC5173-P32 Delivery-valve spring pre-tension 3.0...3.2 mm.

\* This test specification applies only

assemblies on an injection pump test

bench: setting for test equipment, check value for engine equipment. Setting and blocking of pointer of

start-of-delivery sensor on cyl. 1

start of delivery

to the engine/nozzle-and-holder

FUEL DELIVERY CHARACTERISTICS

3rd pressure hPa : 435

Rack travel in m: 12.20...12.60

Bow dimension: Sliding-sleeve position = 37.0 mm

Test pressure, bar: 17...19 BOSCH INJ. PUMP TEST SPECIFICATIONS : 2.75...2.85 Note remarks Prestroke mm : (2.70...2.90) Rack travel in mm : 12.00...13.00 Firing order : 1-5-3-6-2-4 : MAC 11,1 e : 04.09.90 Test sheet Edition : 02.05.90 Replaces Test oil : ISO-4113 : 0 402 746 842 : 0-60-120-180-240-300 Combination no. Phasing Phasing Tolerance + - ° : 0.50 (0.75)Injection pump Pump designation : PES6P120A720RS7164 : 0 412 726 816 EP type number Time to cyl. no. : 1 Governor : RQV325...875PA848-17 Governor design. BASIC SETTING : 0 421 815 200 1st speed rpm: 875 Governer no. Rack travel in mm : 14.90...15.00 Customer-spec. information Customer : MACK TRUCKS Del.quantity cm3/: 22.5...22.7 : EMC6 300L 4VH Engine 100 s: (22.3...22.9) 1st version kW : 200.0 : 1750 Rated speed Spread cm3 : 0.5100 s: (0.9) TEST BENCH REQUIREMENTS 2nd speed rpm : 325.0 Rack travel in mm : 4.7...4.9 Test oil inlet temp. °C : 38...42 Del.quantity cm3/: 3.9...4.5 Overflow valve 100 s: (3.7...4.7) : 2 417 413 011 cm3 : 0.8Spread 100 s: (1.2) Overflow quantity min. 1/h: 160...170 (B) Setting of injection pump with governor Test nozzle holder : 1 688 901 101 assembly GUIDE SLEEVE TRAVEL : 325 1st speed : 1.20...1.40 Opening | travel mm : 207...210 2nd speed : 450 pressure, bar rpm : 3.00...3.40 travel mm : 850 3rd speed Orifice plate rpm : 5.90...6.10 : 1000 diameter mm : 0,6 travel mm 4th speed rpm : 7.40...7.70 travel mm Test Lines : 1 680 750 008 FULL LOAD DELIV. AT FULL LOAD STOP Outside diameter x Wall thickness 1st version x Length mm : 6.00X2.00X600 Speed rpm : 875 Aneroid pressure h: 1200 : 225.0...227.0 1000 : (223.0...229.0) (A) Injection pump setting values Del.quantity Insp. values in parentheses : 5.00 Set equal delivery quant. Spread cm3

1000 : (9.00)

RATED SPEED

per values

BEGINNING OF DELIVERY

1st version Control Lever position degrees: 54...62 Testing: 1st rack travel in: 13.90 rom: 915...925 Speed 2nd rack travel in: 4.00 Speed rom : 1065...1095 4th rack travel in: 1160 rpm : 0.00...1.00Speed LOW IDLE 1 Control lever position degrees: 10...18 Testina: : 275 Speed rom Minimum rack trave: 5.90 rpm : 325 Rack travel in mm : 4.70...4.90 CONSTANT REGULATION rpm : 325...520 Speed TORQUE CONTROL Dimension a mm :? Torque control curve - 1st version rpm : 875 1st speed Rack travel in m: 14.90...15.00 : 510 rpm 2nd speed Rack travel in m: 16.90...17.10 rpm : 700 3rd speed Rack travel in m: 15.70...15.90 4th speed rpm : 600 Rack travel in m: 16.60...16.80 5th speed rpm : 420 Rack travel in m: 0.00...16.80 Aneroid/Altitude Compensator Test 1st version Setting : 510 Speed rpm hPa : 1200 Pressure : 16.90...17.10 Rack travel mm Measurement 1/min: 510 Speed 1st pressure hPa : -Rack travel in m: 10.90...11.30 2nd pressure hPa : 375 Rack travel in m: 12.70...12.80 3rd pressure hPa : 735 Rack travel in m: 15.70...16.10

FUEL DELIVERY CHARACTERISTICS

1st version Aneroid pressure h: 1200

Speed rpm : 510
Del.quantity cm3/ : 307.0...313.0
1000 s: (304.0...316.0)
Spread cm3 : 8.00

1000 s: (12.0) Aneroid pressure h: 1200

: 875 Speed man

Del.quantity cm3/: 179.0...181.0 \* 1000 s: (151.0...175.0)

Aneroid pressure h: -

Speed rpm : 400 Del.quantity cm3/: 156.0...160.0 1000 s: (154.0...162.0)

**BREAKAWAY** 

1st version 1mm rack travel less than

full load rack tr: 13.90 Speed rpm : 915...925

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 160.0...200.0 1000 s: (150.0...210.0)

Rack travel in mm : 10.90...11.30

LOW IDLE

Speed rpm

Rack travel in mm : 4.70...4.90 Del.quantity cm3/: 39.0...45.0 1000 s: (37.0...47.0)

cm3 : 8.00 Spread 1000 s: (12.00)

Remarks:

: MACK # 313GC5181P14

Delivery-valve spring pre-tension 3.0, ..3.2 mm.

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Bow dimension: Sliding-sleeve position = 37.0 mm

BOSCH INJ. PUMP TEST SPECIFICATIONS Note remarks : MAC 11,1a15 : 04.09.90 Test sheet Edition : 02.05.90 Replaces Test oil : ISO-4113 : 0 402 746 846 Combination no. Injection pump : PES6P120A720RS7135 Pump designation EP type number : 0 412 726 807 Governor : RQV325...850PA848-23 Governor design. : 0 421 815 204 Governer no. Customer-spec. information : MACK TRUCKS Customer : E6 300 4VH Engine : 224.0 1st version kW Rated speed : 1700 TEST BENCH REQUIREMENTS Test oil : 38...42 inlet temp. °C Overflow valve : 2 417 413 011 Inlet press., bar: 1.50 Overflow quantity min. 1/h: 160...170 Test nozzle holder : 1 688 901 101 assembly Opening : 207...210 pressure, bar

Orifice plate : 0,6 diameter mm Test lines : 1 680 750 008

Outside diameter x Wall thickness : 6.00x2.00x600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values \_\_\_\_

BEGINNING OF DELIVERY Test pressure, bar: 17...19 : 2.75...2.85 : (2.70...2.90) Prestroke mm

Rack travel in mm : 10.50 : 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasina

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

BASIC SETTING

rpm: 850 1st speed

Rack travel in mm : 12.90...13.00

Del.guantity cm3/: 20.0...20.2

100 s: (19.7...20.5)

Spread cm3 : 0.5

100 s: (0.9)

rpm : 325.0 2nd speed Rack travel in mm: 4.5...4.7 Del.quantity cm3/: 3.2...3.8 100 s: (3.0...4.0)

Spread cm3 : 0.8100 s: (1.2)

(B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL 1st speed

rpm : 325 : 1.20...1.40 travel mm rpm : 450

2nd speed travel mm

: 2.80...3.10 : 850 3rd speed man

: 6.20...6.40 travel mm rpm : 1000 4th speed

: 7.70...7.90 travel mm

FULL LOAD DELIV. AT FULL LOAD STOP

1st version rpm : 850 Speed Aneroid pressure h: 900

Aneroid Deliquantity 1000 : 200.0...202.0 : (197.0...205.0)

: 5.00 cm3 Spread 1000 : (9.00)

## RATED SPEED

1st version Control Lever

position degrees: 50...58

Testina:

1st rack travel in: 11.90 rpm : 900...910 Speed 2nd rack travel in: 4.00

Speed : 1025...1055 rom

4th rack travel in: 1100

rom : 0.00...1.00Speed

LOW IDLE 1 Control lever

position degrees: 7...15

Testina:

: 275 Speed rom Minimum rack trave: 1.50

Speed rpm : 325 Rack travel in mm : 4.50...4.70

CONSTANT REGULATION

: 325...520 Speed rom

TORQUE CONTROL

Dimension a mm

Torque control curve - 1st version

1st speed rpm : 850

Rack travel in m: 12.90...13.00

2nd speed : 700 rpm

Rack travel in m: 13.60...13.70

: 600 3rd speed rom

Rack travel in m: 13.80...13.90

: 500 4th speed rpm

Rack travel in m: 0.00...13.60

Aneroid/Altitude Compensator Test

1st version

Setting

Speed : 600 rom Pressure hPa : 900

Rack travel mm : 13.80...13.90

Measurement

1/min: 600 Speed

1st pressure hPa : -

Rack travel in m: 10.30...10.50

2nd pressure hPa : 250 Rack travel in m: 11.20...11.30

3rd pressure hPa : 475

Rack travel in m: 12.90...13.30

FUEL DELIVERY CHARACTERISTICS

1st version

Aneroid pressure h: 900

Speed rpm : 600 Del.quantity cm3/ : 237.0...243.0 1000 s: (234.0...246.0)

cm3 : 8.00

Spread 1000 s: (12.0) Aneroid pressure h: 900

: 850 Speed rpm

Del.quantity cm3/: 159.0...161.0 \* 1000 s: (141.5...162.5)

Aneroid pressure h: -

Speed rpm : 400 Del.quantity cm3/ : 154.0...158.0 1000 s: (152.0...160.0)

**BRFAKAWAY** 

1st version

1mm rack travel less than

full load rack tr: 11.90

rpm : 900...910 Speed

STARTING FUEL DELIVERY

Speed rpm : 100 Del.quantity cm3/ : 195.0...235.0

1000 s: (185.0...245.0)

Rack travel in mm : 10.30...10.50

LOW IDLE

Speed rpm

Rack travel in mm : 4.50...4.70 Del.quantity cm3/: 32.0...38.0 1000 s: (30.0...40.0)

cm3 : 8.00

Spread 1000 s: (12.00)

Remarks:

: MACK # 313GC5184-P6

Delivery-valve spring pre-tension 3.0...3.2 mm.

\* This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test bench: setting for test equipment, check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

#### Note remarks

Test sheet : MAC 11,1a16 : 04.09.90 : 02.05.90 Edition Replaces : ISO-4113 Test oil

: 0 402 746 847 Combination no.

Injection pump

Pump designation : PES6P120A720RS7135 : 0 412 726 807 EP type number

Governor

Governor design. : RQV325...850PA878-8K

: 0 421 815 205 Governer no.

Customer-spec. information : MACK TRUCKS Customer

Engine : E6 300 4VH

: 224.0 1st version kW : 1700 Rated speed

## TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Openina

: 207...210 pressure, bar

Orifice plate

: 0,6 diameter mm

Test lines : 1 680 750 008

Outside diameter

x Wall thickness

: 6.00X2.00X600 x Length mm

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant. per values \_\_\_\_

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 : (2.70...2.90) Prestroke mm

Rack travel in mm: 10.50

: 1-5-3-6-2-4 Firing order

Phasing : 0-60-120-180-240-300

Tolerance + - ° : 0.50 (0.75)

Time to cyl. no. : 1

## BASIC SETTING

rpm: 850 1st speed

Rack travel in mm : 12.90...13.00

Del.quantity cm3/: 20.0...20.2

100 s: (19.7...20.5)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.0 2nd speed Rack travel in mm : 4.5...4.7 Del.quantity cm3/ : 3.2...3.8

100 s: (3.0...4.0)

cm3 : 0.8 Spread 100 s: (1.2)

# (B) Setting of injection pump with governor

GUIDE SLEEVE TRAVEL

1st speed man

1.20...1.40 travel mm

: 450 2nd speed rpm

2.80...3.10 travel mm

: 850 3rd speed rpm

: 6.20...6.40 travel mm

4th speed : 1000 rpm

: 7.70...7.90 travel mm

## FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 850 Aneroid pressure h: 900

: 200.0...202.0 Del.quantity

1000 : (197.0...205.0)

: 5.00 cm3 Spread

: (9.00) 1000

RATED SPEED	+
1st version Control lever position degrees: 5058	- 1st version - Aneroid pressure h: 900 - Speed rpm : 600 - Del.quantity_cm3/ : 237.0243.0_
Testing: 1st rack travel in: 11.90 Speed rpm: 900910 2nd rack travel in: 4.00 Speed rpm: 10251055 4th rack travel in: 1100 Speed rpm: 0.001.00	1000 s: (234.0246.0) - Spread cm3 : 8.00 - 1000 s: (12.0) - Aneroid pressure h: 900 - Speed rpm : 850 - Del.quantity cm3/ : 159.0161.0 * - 1000 s: (141.5162.5) - Aneroid pressure h: -
LOW IDLE 1 Control lever position degrees: 715	- Speed rpm : 400 - Del.quantity cm3/ : 154.0158.0 - 1000 s: (152.0160.0)
Testing: Speed rpm : 275 Minimum rack trave: 6.10 Speed rpm : 325 Rack travel in mm : 4.504.70	BREAKAWAY  1st version 1mm rack travel less than
CONSTANT REGULATION Speed rpm : 325520	full load rack tr: 11.90 Speed rpm : 900910
Testing: 1st rack travel in: 11.90 Speed rpm : 900910 2nd rack travel in: 4.00 Speed rpm : 10251055 4th rack travel in: 1100 Speed rpm : 0.001.00  LOW IDLE 1 Control lever position degrees: 715  Testing: Speed rpm : 275 Minimum rack trave: 6.10 Speed rpm : 325 Rack travel in mm : 4.504.70  CONSTANT REGULATION Speed rpm : 325520  TORQUE CONTROL Dimension a mm : ? Torque control curve - 1st version 1st speed rpm : 850 Rack travel in m: 12.9013.00 2nd speed rpm : 700 Rack travel in m: 13.6013.70 3rd speed rpm : 600 Rack travel in m: 13.8013.90 4th speed rpm : 500 Rack travel in m: 0.0013.60	INTERMEDIATE RATED SPEED Rack travel in mm : 12.20 Speed rpm : 805 Rack travel in mm : 4.60 Speed rpm : 300  STARTING FUEL DELIVERY  Speed rpm : 100 Del.quantity cm3/ : 195.0235.0
Aneroid/Altitude Compensator Test	1000 s: (185.0245.0) - Rack travel in mm : 10.3010.50 - LOW IDLE
1st version Setting Speed rpm : 600 Pressure hPa : 900 Rack travel mm : 13.8013.90	Speed rpm: 325 Rack travel in mm: 4.504.70 Del.quantity cm3/: 32.038.0 1000 s: (30.040.0) Spread cm3: 8.90 1000 s: (12.00)
Measurement Speed 1/min: 600	- Remarks: - : MACK # 313GC5184-F
1st pressure hPa : - Rack travel in m: 10.3010.50 2nd pressure hPa : 250 Rack travel in m: 11.2011.30 3rd pressure hPa : 475 Rack travel in m: 12.9013.30	Delivery-valve spring pre-tension 3.03.2 mm.  * This test specification applies only to the engine/nozzle-and-holder assemblies on an injection-pump test
FUEL DELIVERY CHARACTERISTICS +	bench: setting for test equipment,

check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery

Note remarks

: MAC 11,1a17 Test sheet : 04.09.90 Edition : 02.05.90 Replaces

Test oil : ISO-4113

: 0 402 746 848 Combination no.

Injection pump

Pump designation : PES6P120A720RS7135

: 0 412 726 807 EP type number

Governor

Governor design. : RQV325...900PA878-9K

: 0 421 815 206 Governer no.

Customer-spec. information

: MACK TRUCKS INC. Customer

Engine : E6-350

: 261.0 1st version kW : 1800 Rated speed

TEST BENCH REQUIREMENTS

Test oil

inlet temp. °C : 38...42

Overflow valve

: 2 417 413 011

Inlet press., bar: 1.50

Overflow

quantity min. 1/h: 160...170

Test nozzle holder

: 1 688 901 101 assembly

Openina

: 207...210 pressure, bar

Orifice plate

diameter mm : 0,6

Test lines : 1 680 750 008

Outside diameter

x Wall thickness

x Lenath mm : 6.00X2.00X600

(A) Injection pump setting values Insp. values in parentheses Set equal delivery quant.

per values

BEGINNING OF DELIVERY

Test pressure, bar: 17...19

: 2.75...2.85 Prestroke mm

: (2.70...2.90)

Rack travel in mm : 10.50

: 1-5-3-6-2-4 Firing order

: 0-60-120-180-240-300 Phasing

Tolerance  $+ - ^{\circ} : 0.50 (0.75)$ 

Time to cyl. no. : 1

BASIC SETTING

rpm: 900 1st speed

Rack travel in mm : 14.80...14.90

Del.quantity cm3/: 24.8...25.0

100 s: (24.5...25.3)

cm3 : 0.5Spread

100 s: (0.9)

rpm : 325.0 2nd speed Rack travel in mm: 4.9...5.1

Del.quantity cm3/: 3.9...4.5 100 s: (3.7...4.7)

cm3 : 0.8Spread

100 s: (1.2)

(B) Setting of injection pump

with governor

GUIDE SLEEVE TRAVEL

rpm : 325 1st speed

1.20...1.40 travel mm

2nd speed : 450 rpm

: 3.10...3.30 travel mm : 850 3rd speed rpm

travel mm : 5.90...6.10

: 1000 4th speed rpm

travel mm : 7.50...7.70

FULL LOAD DELIV. AT FULL LOAD STOP

1st version

Speed rpm : 900

Aneroid pressure h: 1200

: 248.5...250.5 : (245.5...253.5) Del.quantity

1000

cm3 : 5.00 Spread

1000 : (9.00)

RATED SPEED 1st version 1st version Control lever Aneroid pressure h: 1200 position degrees: 56...64 : 625 Speed rpm Del.quantity cm3/: 271.0...277.0 1000 s: (268.0...280.0) Testing: cm3 : 8.001st rack travel in: 13.80 Spread : 950...960 1000 s: (12.0) Speed rpm 2nd rack travel in: 4.00 Aneroid pressure h: 1200 Speed rpm : 850 Del.quantity cm3/ : 159.0...161.0 \* 1000 s: (141.5...162.5) rpm : 1075...1105 Speed 4th rack travel in: 1200 : 0.00...1.00 Speed rom Aneroid pressure h: rpm : 400 LOW IDLE 1 Speed Del.quantity cm3/: 130.5...134.5 1000 s: (128.5...136.5) Control lever position degrees: 7...15 Testing: BREAKAWAY Speed : 275 rom Minimum rack trave: 6.60 rpm : 325 1st version Rack travel in mm : 4.90...5.10 1mm rack travel less than full load rack tr: 13.80 CONSTANT REGULATION rom : 325...520 rpm : 950...960 Speed Speed TORQUE CONTROL INTERMEDIATE RATED SPEED Rack travel in mm: 14.00 Dimension a mm :? Torque control curve - 1st version Speed rpm : 850 1st speed rpm : 900 Rack travel in mm: 5.00 Rack travel in m: 14.80...14.90 Speed rpm rpm : 625 2nd speed Rack travel in m: 15.20...15.30 STARTING FUEL DELIVERY 3rd speed rpm : 700 Rack travel in m: 15.00...15.10 : 500 Speed rpm : 100 Del.quantity cm3/ : 130.0...170.0 4th speed rpm Rack travel in m: 0.00...14.90 1000 s: (120.0...180.0) Rack travel in mm : 8.30...8.70 Aneroid/Altitude Compensator Test LOW IDLE 1st version Speed rpm Rack travel in mm : 4.90...5.10 Setting Del.quantity cm3/: 39.0...45.0 : 625 Speed rom 1000 s: (37.0...47.0) hPa : 1200 Pressure cm3 : 8.00 1000 s: (12.00) Rack travel mm : 15.20...15.30 Spread Measurement 1/min: 625 Speed Remarks: : MACK # 313GC5184-P12 1st pressure hPa : -Rack travel in m: 8.30...8.70
2nd pressure hPa : 310
Rack travel in m: 10.20...10.30 Delivery-valve spring pre-tension 3.0...3.2 mm. 3rd pressure hPa : 710 \* This test specification applies only Rack travel in m: 13.70...14.10 to the engine/nozzle-and-holder assemblies on an injection-pump test

bench: setting for test equipment,

FUEL DELIVERY CHARACTERISTICS

check value for engine equipment. Setting and blocking of pointer of start-of-delivery sensor on cyl. 1 start of delivery